APPENDIX D
PART III: RESPONSIVENESS SUMMARY
BLACKBIRD MINE
SUPERFUND SITE

The responsiveness summary addresses public comments received on the Proposed Plan for the Blackbird Mine Site. The public comment period on the Proposed Plan was held from August 26, 2002 to October 10, 2002. A public meeting was not held because of security concerns. Additional information on the community involvement for this site is discussed in Section 3 of the ROD.

OVERVIEW

The U.S. Environmental Protection Agency (EPA) distributed a Proposed Plan for remedial action at the Blackbird Mine site in Lemhi County, Idaho. The Proposed Plan identified the preferred remedial alternative for the site. The major components of the proposed remedial alternative for the Blackbird Mine presented in the Proposed Plan were as follows:

- **Blackbird Creek Drainage Area:** Meadow Creek Seep Collection; Cover West Fork Tailings Impoundment and Treat Tailings Impoundment Seepage; Removal with Selective Stabilization of Overbank Deposits; Natural Recovery for In-stream Sediments.

- **Bucktail Creek Drainage Area:** Seep Collection and Treatment; Diversion of Bucktail Creek; Natural Recovery of In-stream Sediments

- **Panther Creek Drainage Area:** Combination of Removal of Arsenic Contaminated Soil Along the Banks of Panther Creek and Institutional Controls (if accepted by the current property Owner and a grantee can be obtained). Natural Recovery of In-stream Sediments.

EPA received eight written comments during the public comment period from August 26, 2002 to October 10, 2002 and one comment on November 22, 2002 after the end of the public comment period. The comments and responses are provided below.

<u>Comments from Blackbird Mine Site Group (BMSG) Volume I, Exhibits C and G</u>

Comment 1: *In 1995, the BMSG, the United States and the State of Idaho entered into a Consent Decree that established a goal of reducing copper concentrations to a level sufficient to protect all life stages of salmonids in Panther Creek and Big Deer Creek downstream of the site. In the absence of a Record of Decision (ROD) for the Blackbird Mine, and to expedite cleanup, the parties agreed on a presumptive remedy, called an "Early Action." The Early Action was initiated by the BMSG pursuant to a 1995 EPA Administrative Order on Consent, with the approval of the Trustees. The Early Action was designed to achieve the Consent Decree goal of reducing copper concentrations sufficient to protect all life stages of salmonids in Panther Creek and Big Deer Creek downstream of the site. EPA subsequently required additional removal actions along the banks of Panther Creek and Blackbird Creek, with the result that cleanup*

action has been performed every year since 1995. More than $63 million has been spent to date by the BMSG pursuant to the 1995 Consent Decree and Administrative Order for the performance of Early Action.

Response 1: The BMSG's comment mischaracterizes the purpose and scope of 1995 Consent Decree and the Administrative Orders. The 1995 Consent Decree established a natural resource restoration goal for copper and expressly stated that it did not establish a cleanup goal for the purposes of remedy selection. (See response to Comment 13.) Further, the "Early Actions" performed pursuant to the Administrative Orders were removal actions (not presumptive remedies) designed to make progress toward meeting both the NRD goals and the cleanup goals for this Site.

Comment 2: *Although it may take several years for the full benefits of the Early Action to be seen, the remedial actions performed to date already appear to be sufficient to meet Consent Decree goals in Panther Creek. Several fish species occur in abundance in Panther Creek, including all life stages of salmonids, with no negative effects in terms of reduced abundance, biomass or condition downstream of Blackbird Creek or Big Deer Creek. In Big Deer Creek, there is evidence of fish recolonization. Continued improvements in fish and macroinvertebrate populations are expected to occur without further action at the site. Despite this success, EPA has insisted on proceeding with a Remedial Investigation (RI) and Feasibility Study (FS) and has proposed that further remedial actions be performed at the Blackbird Mine.*

Response 2: It is important to recognize that the standards that EPA is required to apply to selection of a remedial action differ from the NRD goals established in the 1995 Consent Decree. CERCLA establishes specific criteria that must be met in selecting a remedy. Pursuant to Section 121 of CERCLA, the remedy must be protective of human health and the environment and must comply with all applicable and relevant or appropriate requirements (ARARs). Measuring fish populations and macroinvertbrates is one factor in the evaluation to determine if the remedy is protective of the environment. However, there are other aspects of environmental and human health exposures that must also be evaluated to determine if the remedy is protective. The quality of the water for all contaminants of concern is an important measurement of the protectiveness of a remedy as well as a required measurement for compliance with ARARs. Protection of human health and the environment and compliance with ARARS are mandatory standards that must be achieved by the selected remedy. There are also a number of additional criteria that must be balanced in selecting the remedy. The Consent Decree expressly recognized the applicability of these standards to EPA's remedy selection process. (See response to BMSG Comment 13.)

EPA has numerous concerns regarding the fish study presented in Exhibit C of the BMSG's comments. First, the BMSG failed to follow the protocols established in the Administrative Order on Consent and the National Contingency Plan (NCP) regarding agency review and approval of sampling and analysis plans. The NCP specifically requires that "[sampling and analysis plans shall be reviewed and approved by EPA". 40 C.F.R. 300.430(b)(8). The fish study was conducted without an EPA-approved work plan, without EPA oversight, and with no review from the Trustees. During two meetings in the spring of 2002, the BMSG and EPA

discussed performance of a fish study as a deliverable under the RI/FS process to represent post-Early Action and pre-Remedial Action conditions. The BMSG intentionally performed the study without informing and involving the EPA and Trustees. Second, EPA does not agree that the fish study demonstrates there are no negative effects on the fish populations in area creeks. It is important that all life stages of fish and macroinvertebrate populations be demonstrated to be consistently present under varying seasonal conditions for multiple years. The methodology in the fish study is unclear. The raw data have not been provided and the results are inadequate as presented to justify the assertions in this comment. Additional concerns regarding the BMSG's fish study are provided in the response to Exhibit C of the BMSG's comments.

Comment 3: *The BMSG has faced a moving target in the RI/FS process. For six years, the focus was on copper, pursuant to the 1995 Consent Decree. In 2001, EPA decided to establish a preliminary remediation goal (PRG) for cobalt in surface water at Blackbird Mine, despite the absence of a State or Federal standard. The BMSG and EPA have been debating the cobalt PRG for the past year. In late July 2002, after the FS was completed, without prior warning, EPA at the eleventh hour advised the BMSG that it would propose to use EPA water quality criteria in lieu of the Idaho standards for copper and arsenic, the latter never having been previously identified as a pollutant of concern for surface water.*

Response 3: As stated in the response to Comment 1 and more specifically discussed in the response to Comment 13, the 1995 Consent Decree established a natural resource restoration goal for copper. The 1995 Consent Decree expressly states that it did not establish a cleanup goal for the purposes of remedy selection.

The RI/FS is an iterative process. The RI/FS provides a process for EPA to identify and evaluate hazardous substances that may pose a threat to human health and the environment. The RI/FS AOC clearly placed the BMSG on notice that EPA intended to utilize the remedial procedures of CERCLA to address multiple pollutants and streams even if they were not covered by the 1995 Consent Decree (see response to BMSG comment 13). During the RI/FS, the presence of cobalt was identified as a potential threat to the environment. A risk evaluation of the threat posed by cobalt to fish was performed and a PRG was established. EPA provided the BMSG, the State and the Trustees an opportunity to comment on the PRG and there have been a number of discussions and meetings among EPA, the Trustees and the BMSG regarding the cobalt PRG. EPA has carefully reviewed the information and materials provided by the Trustees and the BMSG on the cobalt PRG and has concluded that the cobalt PRG is appropriate.

Throughout the RI/FS process, EPA retained the possibility that the EPA ambient water quality criteria (FWQC) could be applied to this Site as a relevant and appropriate standard. In September of 2001, the document covering Remedial Action Objectives/Preliminary Remediation Goals identified the FWQC as a potentially relevant and appropriate cleanup standard. In commenting on the draft FS in early 2002, EPA directed the BMSG to add a discussion of the FWQC as potentially relevant and appropriate and directed that a quantification of the FWQC be added to the relevant tables in the FS. The FWQC was added to the FS discussion as potentially relevant and appropriate. These ongoing references to the FWQC as potentially relevant and appropriate made it clear that the FWQC would be evaluated as a

potential cleanup standard and that such evaluation could result in the use of the FWQC as the appropriate standard for this Site.

Comment 4: *The BMSG also has faced a moving target procedurally. When the proposed plan was announced on August 12, 2002, neither the administrative record for the plan nor the Blackbird site file were completed and available for review by the BMSG. Upon inspection early in September, there were still materials that we could not review because they had not been placed in the file or because there was uncertainty concerning the presence of privileged documents in the file. Moreover, more than 30 days is required to evaluate the complex and new issues raised by the proposed plan. Therefore, consistent with EPA guidance for complex sites, the BMSG requested a 60-day period for comments. EPA initially denied the request. Subsequently, by letter dated September 13, 2002, EPA reconsidered and granted the BMSG's request for an extension of time to October 10, 2002. We reserve and request the right to submit supplemental comments to address documents we have not previously received and issues we have not had sufficient opportunity to address fully in these comments.*

Response 4: When the proposed plan was announced, EPA had copies of the administrative record available for review in Seattle, Washington, Boise, Idaho and Salmon, Idaho. Additions were made to this administrative record to add correspondence with the BMSG and other materials familiar to the BMSG, as well as correspondence with the Trustees. These additional materials were made available to the BMSG for review and copies of many of the documents were provided to the BMSG. The BMSG had an opportunity to review these materials during the extra 30 days that were granted by EPA.

Comment 5: *EPA's proposal sets aside the applicable Idaho water quality standards for copper and arsenic and instead proposes to rely on the Federal Water Quality Criteria ("FWQC") as proposed remediation goals (PRGs). These proposed ARARs were announced just recently without warning or justification. They are not relevant or appropriate for several reasons. The FWQC is simply guidance, it is not an applicable standard. Pursuant to CERCLA and EPA's own policy, the applicable Idaho WQS are the proper ARARs, not the FWQC. The criteria for copper set forth in the Consent Decree and specifically the BRCP reflect the agreement of the parties and may not be changed by EPA. Moreover, the FWQC are not scientifically appropriate for the Blackbird Mine site. Finally, natural copper concentrations in nearby streams unaffected by Blackbird Mine exceed the FWQC for copper.*

Response 5: EPA has consistently stated that the cleanup selected in the ROD will be required to meet ARARs. In fact, the 1995 Consent Decree expressly states that "[n]othing in this Consent Decree is intended to predetermine or limit EPA's authority to select any Response Actions, including clean-up standards pursuant to Section 121 of CERCLA, 42 U.S.C. 9621, related to the Site". (Page 3 of 1995 Consent Decree) Section 121 of CERCLA specifically identifies the Federal Ambient Water Quality Criteria (FWQC) as potentially relevant and appropriate for cleanup actions and Section 121(d)(2)(B) of CERCLA establishes specific factors that EPA must evaluate to determine whether the FWQC is relevant and appropriate. The Proposed Plan requested comment on these specific factors. EPA has evaluated all of the comments received on this matter and has determined, based primarily on research provided by

the State of Idaho, that the FWQC for copper are not relevant and appropriate under the circumstances of the release at this Site. The State of Idaho's research provides 1) a review of several studies of the effects of copper toxicity tests to relevant species which would occur at the Site and 2) a literature review of salmonid copper toxicity tests which indicates that the Idaho copper criteria would be protective of the coldwater aquatic life at the Site. Further discussion regarding this determination is contained in Chapter 13 of the ROD.

Comment 6: *There is no Idaho standard for cobalt applicable to surface waters at the Blackbird Mine, nor is there even an EPA FWQC for cobalt. Undaunted, EPA has invented a cobalt PRG for the Blackbird Mine site, which it then relies on to justify expensive remedial action for collection and treatment of groundwater from the West Fork Impoundment. The proposed cobalt cleanup level is not appropriate. It is inconsistent with the Consent Decree. It has not undergone peer review. It is based on an inaccurate evaluation of the available information and incorrect and unconventional manipulations of the available data. A proper assessment for cobalt demonstrates that no further reduction in cobalt is needed for protection of all life stages of salmonids in Panther Creek and Big Deer Creek.*

Response 6: In the absence of a state standard or federal criteria, development of a risk-based PRG for cobalt in surface water to evaluate protectiveness of alternatives in the FS and the selected remedy is consistent with the NCP. The proposed cobalt PRG (i.e., cleanup level) has been discussed in many meetings and conference calls with the BMSG and the Trustees. It is based on the best available scientific data. (See the response to the BMSG's Comment 30 below.) It has undergonereview by the State, the Trustees and their contractors. EPA has carefully reviewed and analyzed all the comments and has, as appropriate, made changes to the technical analysis for the cobalt remedial goal. EPA has performed an appropriate evaluation of cobalt based upon the existing information. Based upon the results of this evaluation, EPA has determined that additional actions are necessary to address cobalt concentrations in surface waters at the site that continue to exceed the cobalt cleanup level. Finally, nothing in the 1995 Consent Decree precludes EPA from selecting a cobalt cleanup level for this Site.

Comment 7: *EPA's analysis of the effectiveness of the alternatives is fatally flawed, resulting in a proposed remedial plan that is inappropriate and arbitrary. EPA has undertaken no analysis of the achievability of its recently conceived, proposed PRGs for copper or arsenic, and indeed the draft FS was prepared before EPA decided to propose those PRGs. There is thus no basis to conclude that the proposed plan will achieve those inappropriate goals.*

Response 7: EPA disagrees that the analysis of the effectiveness of the alternatives is "fatally flawed". The proposed plan analyzed the effectiveness of the alternatives in meeting the federal criteria for copper and stated that the cleanup level for arsenic in surface water was under evaluation by EPA. Since EPA has determined that the State of Idaho water quality criteria are the appropriate cleanup standards for copper and arsenic at this Site, the assertions of the BMSG in this comment are no longer relevant. The FS explicitly analyzes the selected remedial action and the other alternatives regarding their ability to achieve the state water quality standards.

Comment 8: *With respect to cobalt, EPA rewrote the evaluation of alternatives in the FS (Chapter 7), making major changes from the version submitted by Golder Associates for the BMSG. EPA's alteration biases the evaluation to support the selection of alternatives BB-7 and BT-5 in the proposed plan. A correct use of the loading reduction information is shown in Table 7-10 of the attached Section 7 of the FS and discussed below. See Exhibit A, Chapter 7, Focused Feasibility Study for the Blackbird Mine Site, Golder Associates, September 12, 2002. As discussed above, existing cobalt levels are protective and no further remediation is warranted.*

Response 8: EPA re-wrote portions of Chapter 7 of the FS because the BMSG was unwilling to appropriately incorporate EPA's comments on several draft versions of Chapter 7 of the FS (see additional discussion in the response to the BMSG's Comment 34 below). EPA does not agree that the loading reduction information provided in Exhibit A of the BMSG comments is an appropriate representation of the potential load reductions that would be experienced under the various alternatives. (See the responses to the BMSG's Comments 35 through 38 below for additional discussion of the load reduction tables.)

Comment 9: *EPA's proposed alternative BT-5 includes a pipeline for diversion of Bucktail Creek surface water around South Fork Big Deer Creek to achieve quality goals in South Fork Big Deer Creek. However, there is no basis to conclude that this would be the case. Moreover, no environmental benefit would be gained by attempting to achieve water quality goals in South Fork Big Deer Creek. It is poor potential fish habitat, and natural physical barriers (log jams and water falls) inhibit the colonization of fish. The alternative is also inconsistent with the Consent Decree.*

Response 9: The analysis in the FS showed that water quality PRGs, including the State water quality standard, are expected to be met in the South Fork of Big Deer Creek from reducing the metal loads into the South Fork of Big Deer Creek with the Bucktail Creek diversion. The ROD identifies that contingent action alternatives will be evaluated after the implementation of the Bucktail Creek diversion if metals discharges result in exceedances of water quality cleanup levels. One of the threshold criteria in the NCP for selecting an alternative is that ARARs must be met. There is a State water quality standard for copper in the South Fork of Big Deer Creek for cold water biota. Therefore, the EPA's selected remedy must meet the ARAR unless the ARAR is waived. The criteria to waive an ARAR is not currently met or justified. This response action is not inconsistent with the 1995 Consent Decree.

Comment 10: *With respect to the Panther Creek properties, EPA continues to overstate potential risks to human health. A scientifically valid analysis would show that the future residential use scenario for Panther Creek properties will not result in unacceptable potential future risks. There is thus no need to consider future removal actions or institutional controls on Panther Creek properties.*

Response 10: The human health risk assessment (HHRA) was performed following EPA guidance. In accordance with EPA guidance, risk estimates are based on reasonable maximum exposure assumptions. Using these reasonable maximum exposure assumptions, potential future

risks for three private properties (assuming full-time residential use of the properties) exceed EPA's acceptable risk range. Therefore, future removal actions or institutional controls are needed for these properties. See the responses to the BMSG's Comments 46 through 50 for details of specific exposure assumptions and toxicity values used in the risk calculations for the HHRA.

Comment 11: *The alternatives proposed by EPA for stream sediments rely primarily on natural recovery of in-stream sediments. The BMSG agrees that this is the correct approach for in-stream sediments. However, the proposed plan should make it clear that there is no known risk to aquatic organisms at concentrations currently existing in the in-stream sediments.*

Response 11: Benthic invertebrate data continue to show impacts relative to reference locations; these data were collected by the BMSG and demonstrated that while populations have improved, benthic communities in areas impacted by mining disturbance are suppressed with respect to reference areas. In addition, there is not sufficient data available to justify that there are no known risks due to exposure to sediment. Therefore, EPA disagrees with the BMSG's assertion that there is no known risk to aquatic organisms due to current metal and arsenic concentrations in the sediment.

Comment 12: *In Section 6 of the FS, EPA has included possible "contingent actions" that might be evaluated by EPA if the selected actions do not meet remediation goals in an acceptable time frame. This type of 'catch all' listing of contingent actions is not appropriate. Given all the progress that has been made at the Blackbird Mine since 1995, the Superfund process should be drawing to a close, not launching into an open-ended series of actions.*

Response 12: The FS discusses that there is uncertainty concerning whether some of the components of the remedial action will be effective in meeting remedial action objectives (RAOs) and cleanup levels. Because of this uncertainty, the potential for contingent actions in the future must be acknowledged. The only other option is to take other actions now that have more certainty of achieving RAOs and cleanup levels but are more costly. The BMSG has objected to taking actions that have more certainty (for example, active treatment at the confluence of Bucktail Creek and South Fork of Big Deer Creek).

Comment 13: *In 1995, the BMSG agreed to undertake certain obligations specified in the Consent Decree, and in return the United States and the State agreed to release the BMSG with respect to all matters raised in the lawsuits. The 1995 Consent Decree provided that water quality goals would focus on attaining copper standards in Panther Creek and Big Deer Creek in order to sustain salmonids through all life stages. In contrast, EPA's proposed plan contains water quality goals for cobalt and arsenic, pollutants not specified, and addresses streams such as Blackbird Creek and South Fork Big Deer Creek that are not specified in the Consent Decree. EPA may elect to address pollutants or streams not covered by the Consent Decree using monies provided by the U.S. Superfund fund and the State. Alternatively, the Consent Decree may be modified by agreement of all of the parties. However, EPA may not unilaterally impose new obligations upon the BMSG.*

Response 13: The BMSG comments misinterpret the 1995 Consent Decree. The 1995 Consent Decree expressly states that it does not predetermine or limit EPA's authority to select any Response Actions, including establishing cleanup standards pursuant to CERCLA. (Section 1, page 3). This language recognizes that the 1995 Consent Decree does not limit EPA's responsibility to select a response action for this Site and that such response action is expected to comport with the requirements of CERCLA. The 1995 Consent Decree also states that EPA may establish a standard for water quality at the Site different from the standard set forth in the Consent Decree and establishes a process for the Trustees to modify the 1995 Consent to reflect the standard selected by EPA. (Paragraph 5(c) of the 1995 Consent Decree). These provisions of the 1995 Consent Decree clearly recognize EPA's authority to select a response action in accordance with the requirements of CERCLA.

Prior to the entry of the 1995 Consent Decree, the BMSG entered into an Administrative Order on Consent to perform the RI/FS for the Site. The RI/FS AOC made it clear that the RI/FS could include multiple contaminants; multiple stream segments and tributaries; and additional cleanup goals. This RI/FS AOC clearly placed the BMSG on notice that EPA intended to utilize the remedial procedures of CERCLA to address multiple pollutants and streams even if they were not covered by the 1995 Consent Decree. In addition, the BMSG was a signatory to the RI/FS AOC and agreed to the above.

Pursuant to the 1995 Consent Decree, the BMSG agreed to perform Response Actions related to the Site in accordance with the ROD which is being issued by EPA after completion of the RI/FS (Section I, page 3; Section V.B.b., Page 7). The 1995 Consent Decree clearly recognizes that these response actions are in addition to the NRD restoration activities.

Comment 14: *Attached to these comments are Exhibits that are referenced herein and are incorporated as part of these comments. We also reference various documents that we understand are in the administrative record. A list of references is included at the end of these comments. If any of these references are not contained in EPA's administrative record, please advise us promptly so that we may submit a copy for the record. If EPA adds documents or other information to the administrative record, or if EPA provides new explanations of the basis of or justification of its proposed plan, the BMSG requests notice and an opportunity to submit supplemental comments.*

Response 14: Comment Noted. All documents are already included in the administrative record with the exception of the Windward (2002) report. The BMSG was contacted to send the document to EPA for inclusion in the administrative record. EPA has not received the document from the BMSG.

Comment 15. *Early Action was initiated in 1995 and performed under an Administrative Order on Consent between the EPA and BMSG. The EPA, BMSG and the Natural Resource Trustees (Trustees) each agreed on the general approach necessary to control the release of copper from the site. The Early Action was performed with the intent to achieve the Consent Decree goal of protecting all life stages of salmonids in Panther Creek and Big Deer Creek downstream of the site. Major reductions in the concentrations of copper and other metals were achieved in*

Panther Creek and Big Deer Creek as a result of the Early Action. The success of the Early Action is evident in the reductions in copper concentrations in Panther Creek and Big Deer Creeks. In 1995, the peak copper concentrations measured in Panther Creek and Big Deer Creeks downstream of site tributaries were 0.218 mg/L and 0.342 mg/L, respectively. Peak copper concentrations during 2000 were 0.012 mg/L in Panther Creek and 0.021 mg/L in Big Deer Creek. This represents reductions of 94% in each stream.

Response 15: In accordance with the 1994 RI/FS and Other Removal Action Administrative Order on Consent Statement of Work (AOC SOW) and paragraph 24 of the 1995 Removal Action AOC, the objectives of the Early Action were to support restoration of water quality and aquatic biota in Panther Creek below the confluence of Blackbird Creek to levels capable of supporting all life stages of anadromous and resident salmonids, and support restoration of water quality and aquatic biota in Big Deer Creek below the confluence of South Fork of Big Deer Creek to levels capable of supporting all life stages of resident salmonids. The significant reductions in dissolved copper loadings following the Early Actions were noted in the Feasibility Study and in Section 5 of the ROD. However, the dissolved copper concentrations in Panther Creek and Big Deer Creek still show a risk and do not meet EPA's remedial goals, the State WQS for copper and NPDES ARARs during significant portions of the year. Therefore, the additional actions identified in the ROD are necessary to meet the remedial goals and ARARs for copper and other contaminants of concern.

Comment 16: *The abundance of both fish and benthic macroinvertebrates, which represent a food source for salmonids, has increased substantially since the completion of the Early Action. The recovery of benthic macroinveretbrates was documented by Golder Associates in the RI Report. The agencies have also acknowledged the improvements in macroinvertebrate populations. In comparing 1995 and 1998 Panther Creek data collected by the Idaho Department of Environmental Quality, the State summarized "The results show significant improvements in the biological condition between 1995 and 1998…. In 1998, all metrics were more closer to upstream values, suggesting subtle impairment to the macroinvertebrate assemblage, versus the earlier severe effects." (IDEQ, 2001). Additional improvements have been documented since 1998. (See Exhibit B, Final Blackbird Mine Site Remedial Investigation Addendum, 2001 Sample Results, Section 6, Benthic Invertebrates, Golder Associates, September 12, 2002). Although slight differences in some species of organisms between upstream and downstream stations in Panther Creek remain, these differences are not believed to affect the ability of salmonids to obtain adequate food.*

Response 16: Given the limited benthic macroinvertebrate data available, populations of benthic invertebrates appear to have improved. However, benthic macroinvertebrate populations remain suppressed with respect to reference area populations. There remain clear differences in the various benthic invertebrate parameters between impacted and unimpacted areas. There is no evidence to support the BMSG's conclusion that food supplies are adequate for all life stages of salmonids. The BMSG's fish study (included in Exhibit C of the BMSG's comments) fails to provide this evidence.

Comment 17: *A fish study was recently conducted by consultants at the request of the BMSG (See Exhibit C, Assessment of the Presence, Abundance, and Condition of Fish in the Panther Creek Drainage, Beak International Inc. & Golder Associates, October 2002). This study shows that several fish species occur in abundance in Panther Creek, with no negative effects in terms of reduced population, biomass or condition downstream of Blackbird Creek or Big Deer Creek. Chinook salmon fry are present throughout a 30-mile length of Panther Creek, with significant numbers present between Deep Creek and Musgrove Creek, where the best spawning and rearing habitat occurs. Likewise, rainbow trout are present throughout Panther Creek at high densities, with a size-frequency distribution indicating that all life stages are supported throughout.*

The recent Beak/Golder study found that sampled fish were healthy with no difference in condition between upstream (reference) and downstream (affected) stations in Panther Creek. These results show that food and habitat conditions within mainstream Panther Creek are presently adequate to support healthy populations of salmonids in both affected and unaffected stream reaches. These findings are consistent with snorkel surveys conducted by the Idaho Department of Fish and Game (IDFG) in recent years. The IDFG snorkel surveys have documented major increases in rainbow trout in Panther Creek since completion of the Early Action. (See Exhibit C, Beak/Golder 2002.)

The remedial actions performed to date appear to be sufficient to protect all life stages of salmonids in Panther Creek. In Big Deer Creek, the Beak/Golder fish survey indicates evidence of fish recolonization. Continued improvements in fish and macroinvertebrate populations are expected to occur without further action at the site. It may take several years for the full benefits of the Early Action to be seen.

Response 17: There are numerous limitations regarding the BMSG's fish study (Exhibit C) as it is presented such that it cannot be used to justify the statements in this comment. For example, the BMSG's fish study was conducted without an approved work plan from the EPA. The BMSG failed to notify and acted without concurrence of the other stakeholders involved in the project. This action is inconsistent with the terms of the Administrative Order on Consent and the National Contingency Plan, 40 C.F.R. 300.430(b)(8), which require review and approval of the sampling plan by EPA. The BMSG fish study was conducted without review of the methodology or the results. The data cannot, therefore, be considered impartial. The methodology as presented is inadequate to determine if appropriate quality assurance procedures were followed. The methodology as presented is also inadequate to determine why some locations were sampled quantitatively while others were sampled qualitatively.

There are other limitations to this study as well. The results are inadequate to determine if the data are conclusive, or even suggestive. For example, while the BMSG states that dietary preferences were investigated by analyzing some fish unintentionally killed as the result of electroshocking, it is unknown how many fish of each species were analyzed. There are no statistics presented; therefore, it is unknown how reliable these results might be. It is also unknown if enough fish were collected to make a definitive statement regarding feeding habits. Thus, the BMSG's data are indicative of improved conditions, but are inconclusive.

In addition, prior to the survey, there was a failure in the outlet structure of the clean water reservoir on upper Blackbird Creek. This failure released potentially large numbers of fish downstream. This release confounds the current study, as it could skew the population data significantly.

The word "evidence" as used by the BMSG is misleading since data from only one sampling event are provided. These data represent only one sampling point in time. Because of this, the data are not sufficient evidence to determine the current or future state of fish populations in the impacted area creeks.

Water quality data apparently were not collected in conjunction with the fish data. Metal concentrations are low in August in Blackbird and Panther Creeks, the time during which the fish survey was conducted. Typically the copper WQS and cobalt remedial cleanup level are not exceeded in Panther Creek in August. This could have affected the status of fish populations in Blackbird and Panther Creek. The fish study data are inadequate to determine if fish occupy these habitats year round, or if peak concentrations of cobalt or copper produce elevated levels of mortality or morbidity, temporarily reducing populations or altering fish communities. This study does not demonstrate that further remedial actions are not needed to protect human heath and the environment. See also the comments to Exhibit C.

Comment 18: *The Site Characteristics section of the proposed plan does not distinguish between pre- and post-Early Action conditions and makes several inaccurate statements or assumptions that provide a flawed basis for the proposed remedial action. The proposed plan states that fisheries and aquatic resources downstream of the Blackbird Mine have been impacted by arsenic, copper and cobalt releases. EPA has not shown that arsenic and cobalt releases have ever impacted fisheries and aquatic resources at the site. Although the fisheries and aquatic resources were impacted by copper releases, substantial improvement in conditions has occurred as a result of the Early Action. EPA indicates that the copper concentrations in Panther Creek continue to frequently exceed the FWQC. This is not correct. The 2000-2001 data indicate that the State water quality standard for copper is met during low flow conditions which occur during most of the year.*

Response 18: The aquatic risk assessment shows a potential risk to aquatic receptors from arsenic, copper and cobalt. Both the federal water quality criteria and State water quality standard for copper are exceeded and the fisheries and aquatic resources are still impacted by copper releases despite the improvements in water quality from the Early Actions. EPA considers annual exceedances of the copper FWQC during high flow for several weeks as frequent. Therefore, the Site Characterization section in the Proposed Plan is accurate.

Comment 19: *In the proposed plan, EPA also fails to acknowledge that the area is highly mineralized with natural deposits. Releases from undisturbed mineralized areas naturally result in elevated metals concentrations in streams. For example, the RI report (Golder, 2001) documented that copper concentrations in tributary streams to Panther Creek (Clear Creek, Elkhorn Creek, South Fork Big Deer, Slippery Creek, Ludwig Gulch, Big Jureano Creek), free from any influence from the Blackbird Mine, have been measured at between 0.006 and*

0.013 mg/L, which would exceed the FWQC for copper. Much higher concentrations can often be found in seeps and small tributary flows closer to natural sources.

The FWQC for copper was likely exceeded in surface water downstream of the Blackbird Mine site prior to the existence of the mine. The systems installed under the Early Action are collecting and treating some of these natural sources of copper in addition to sources that resulted from mining operations. Remaining natural sources of copper could preclude attainment the FWQC for copper at some locations downstream of the mine. The BMSG reserves the right to submit supplemental comments and information that we may obtain in the future on natural sources of copper and other metals. It is important that EPA take into account sources other than Blackbird Mine and the substantial biological recovery that has already occurred instead of presuming the need for further remediation at the site.

Response 19: EPA has repeatedly encouraged the BMSG to develop a statistically valid study of background concentrations of the various media in the vicinity of the site. The BMSG's reluctance to pursue this study has meant that EPA has had to utilize existing information when background was being considered in setting PRGs at the site (e.g., the PRGs for overbank soils and in-stream sediments).

The existing data for area streams, where it appears that background may exceed the water quality goals, are often contradictory. This is potentially because the data were collected at different times by different entities utilizing different QA/QC procedures. For instance, the data for Clear Creek, Elkhorn Creek, South Fork Big Deer Creek, and Ludwig Gulch indicate that the water quality measured in the past has exceeded the water quality cleanup levels at some times and not at others. A more robust data set would be required to conclude that these creeks consistently exceed the water quality goals. Regardless, there are no data to indicate whether surface water downstream from the Blackbird Mine exceeded water quality goals prior to the existence of the mine.

Comment 20: *The Aquatic Ecological Risk Assessment, which is flawed in many respects, was used by EPA as a basis for development of inappropriate preliminary remediation goals (PRGs). The inappropriate PRGs resulted in the invalid evaluation of alternatives in the FS.*

EPA's flawed process of assessing risks to aquatic organisms was initiated in the Draft Aquatic Ecological Risk Assessment Work Plan received by the BMSG on October 27, 2000. The BMSG provided comments on the work plan to EPA on November 13, 2000 and on a subsequent version of the work plan on January 9, 2001. (See Exhibit D, BMSG Comments on EPA's Aquatic Ecological Work Plan, Risk Assessment, and Preparation of the FS Report.) Our comments focused mainly on the ecological management goals and assessment endpoints identified in the draft work plan. We pointed out our disagreement with setting goals in tributary streams to Big Deer Creek and Panther Creek. The Consent Decree set water quality goals only for Big Deer Creek and Panther Creek. Setting ecological management goals and assessment endpoints in Blackbird Creek, Bucktail Creek and South Fork Big Deer Creek is unnecessary, unrealistic, and inconsistent with the Consent Decree.

EPA did not address or respond to our comments on the work plan and instead proceeded with preparation of the risk assessment, incorporating the inappropriate goals in the evaluation process.

Response 20: EPA considered the BMSG comments on the Aquatic Ecological Work Plan and Risk Assessment and did respond to the BMSG comments in writing, which is not a requirement. EPA did not agree with many of the BMSG comments on the work plan. The EPA is not limited by the terms of the Consent Decree (see Response No. 13). As discussed in response 13, the provisions of the 1995 Consent Decree clearly recognize EPA's authority to select a response action in accordance with the requirements of CERCLA.

Comment 21: *The 1995 Consent Decree set compliance points only for Big Deer Creek and Panther Creek. Experts for the BMSG and the agencies agreed during negotiation of the Consent Decree that establishment of restoration goals for Blackbird Creek, Bucktail Creek, and South Fork Big Deer Creek was not realistic.*

Subsequent to the entry of the Consent Decree, the State of Idaho prepared use attainability analyses for both Blackbird Creek and Bucktail Creek concluding that those streams cannot be remedied to achieve water quality criteria in the foreseeable future. (See Exhibit E, Use Attainability Analyses for Blackbird Creek and Big Deer Creek and BMSG Comment Letter). As a result, State aquatic life use designations were removed for these streams, with EPA approval. The BMSG commented in a November 7, 2001, letter (see Exhibit E) that the same determination should be made for South Fork Big Deer Creek. As a result of the use attainability analyses and changes in use designations, there was no basis for EPA to establish ecological management goals for aquatic life in these tributary streams.

Response 21: As discussed in response 13, the provisions of the 1995 Consent Decree clearly recognize EPA's authority to select a response action in accordance with the requirements of CERCLA. At a minimum, CERCLA requires EPA to achieve water quality levels that will be protective of the designated use for each stream. At this Site, Panther Creek, Big Deer Creek and South Fork Big Deer Creek are designated by the State of Idaho for use by cold water biota. Blackbird Creek's designated use is for secondary contact recreation. The selected remedial action must be protective of cold water biota for each of these designated stream segments and for secondary contact recreation in Blackbird Creek. The selected remedy must also result in improvements to impaired stream segments of Blackbird Creek and Bucktail Creek.

Comment 22*: We also object to setting ecological management goals and assessment endpoints to support threatened or endangered salmonid species on an individual basis, rather than on a population basis. Achieving population-level goals is the accepted scientific method for assuring recovery of species. There is no established method for setting goals and aquatic cleanup levels for individual organisms. Setting such ecological management goals for individual fish is not necessary or realistic and is not needed for compliance with the Endangered Species Act or for achieving the Consent Decree goal of protecting of all life stages of salmonids.*

Response 22: Establishment of ecological management goals and assessment endpoints protective of threatened or endangered salmonids at the individual level is an appropriate goal. This goal is intended to prevent mortality or reproductive failure of individuals which would then lead to population level effects. This is supported by 50 CFR Part 222, Final Rule on the Definition of Harm (Federal Register November 8, 1999; Volume 64, No. 215). Harm is defined therein as actions that kill or injure individuals of threatened or endangered species, or modify or impair their habitats. Metal concentrations at toxic levels can be considered to produce harm, and individuals therefore need to be protected. Finally, OSWER has issued a directive that requires protection at the individual level for special status species (OSWER Directive 9285.7-28P, Section III, Pg. 3). Therefore, EPA has acted in accordance with applicable Federal regulations and requirements in setting cleanup goals to be protective of threatened or endangered species on an individual level.

Comment 23: *The risk assessment focused too narrowly on the calculation and evaluation of hazard quotients (HQs) for the various metals at the site. In many cases, insufficient toxicological information exists to adequately establish toxicity reference values on which to calculate HQs. We pointed out that calculation of HQs should be a component of the risk assessment, HQs of greater than one cannot be used solely as an indication of unacceptable risk. A basic flaw in EPA's risk assessment is that it relies almost exclusively on the evaluation of HQs that are often based on unrealistically low toxicity threshold values. This flaw was carried into the establishment of remedial action objectives, preliminary remediation goals, and now the cleanup levels in the proposed plan. Comments on the cleanup goals for specific media and metals are provided below.*

Response 23: It is incorrect to state that insufficient toxicological information exists by which to calculate HQs. There are water quality criteria for most of the metals of concern. EPA relied on hazard quotients due to the lack of other types of data such as adequate benthic invertebrate data or fish population data. Cleanup levels were based on either ARARs, a weight of evidence approach, or HQs (see responses below).

Comment 24: *EPA provided no written response to the BMSG's 54 pages of comments and very few of the comments were addressed in the next draft of the Aquatic Ecological Risk Assessment. We submitted additional comments on July 27, 2001 (See Exhibit D). EPA finalized the risk assessment on August 27, 2001, with major disagreements on the ecological management goals and toxicity reference values unresolved. EPA carried its flawed ecological management goals and assessments of risk into the preparation of the FS and the establishment of remedial action objectives (RAOs) and preliminary remediation goals (PRGs). The BMSG reiterated its disagreement with EPA's risk assessments, RAOs, and PRGs in letters dated October 2 and December 28, 2001 (See Exhibit D).*

Response 24: EPA is not required to provide written responses to BMSG comments on any deliverable. BMSG comments are addressed in the final Aquatic Ecological Risk Assessment and RAO and PRG memorandum to the extent that EPA agreed with the comments.

Comment 25: *EPA May Not Substitute FWQC In Lieu Of Idaho Standards. EPA proposes to establish surface water cleanup goals for copper and arsenic based on the Federal Water Quality Criteria ("FWQC") as opposed to the Idaho Water Quality Standards. We submit that use of the FWQC would be inconsistent with the 1995 Consent Decree, the statutory requirements of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), and the guidelines established by EPA.*

Section 5(c) of the Consent Decree states that ambient water quality criteria for copper shall be achieved as set forth in the Biological Restoration and Compensation Plan (BRCP), to attain the goal of achieving a level of water quality in Panther Creek and Big Deer Creek sufficient to sustain all life stages of salmonids. At the time the 1995 Consent Decree was established, the copper FWQC and the copper criteria in the BRCP and the Idaho standard for copper in surface waters were identical. The copper standard was based on a minimum hardness of 25 mg/l. See Consent Decree Appx. B at 23-24 and IDAPA 58.01.02.210.

Although EPA established more stringent FWQC for copper in 1999, the criteria in the BRCP and the Idaho standards remain the same. It was the intent of the BMSG in 1995 that the copper criteria consist of that specified in the Consent Decree rather than a moving target incorporating then unknown, future EPA FWQC. As counsel for the United States and the State of Idaho stated in their letter to the BMSG dated April 25, 2002, p. 3 "we believe that the criteria set forth in the BRCP are consistent with our understandings developed during the negotiated process." EPA's proposal to establish copper FWQC for Blackbird Mine more stringent than the BRCP criteria violates the government's agreement in the 1995 Consent Decree. The United States (including EPA) and the State are bound as a matter of contract, namely the 1995 Consent Decree, from unilaterally changing a significant provision.

It is also well settled that, because consent decrees are recognized as contracts, any ambiguous terms in the decree can be interpreted using evidence of events and circumstances surrounding the negotiations. In this case, a court would likely consider that there were many parties involved in the consent decree negotiation, including the State of Idaho and the BMSG, and would conclude that it is unlikely that these parties would have agreed to the terms of the decree if they interpreted these terms as allowing EPA to unilaterally change the applicable water quality standard for dissolved copper. For these reasons, EPA cannot unilaterally change the water quality standard for copper at the Blackbird site. Such an action would constitute a breach of the Consent Decree.

That is not to say that the numerical copper standard cannot be changed. Like other provisions of the Consent Decree, the copper standard may be modified through Section XXXII (Modification). The modification provision states that "no material modifications shall be made to the BRCP without written notification to and written approval of the State, the United States, and Settling Defendants ... ." This reflects general principles of contract law governing consent decrees. EPA, therefore, may not modify the water quality standard for dissolved copper provided for in the Consent Decree absent written approval from the BMSG.

Response 25: The BMSG comments completely misinterpret the 1995 Consent Decree. The 1995 Consent Decree expressly states that it does not predetermine or limit EPA's authority to select any Response Actions, including establishing cleanup standards pursuant to CERCLA. (Section 1, page 3.) This language recognizes that the 1995 Consent Decree does not limit EPA's responsibility to select a response action for this Site and that such response action is expected to comport with the requirements of CERCLA. The BMSG's interpretation of Paragraph 5(c) contradicts the express language in that Paragraph in two regards. First, Paragraph 5(c) establishes the Federal Aquatic Water Quality Criteria as the criteria for copper. Second, Paragraph 5(c) expressly contemplates the possibility that EPA may establish a standard for water quality that differs from the standard set forth in the Consent Decree and establishes a process for the Trustees to modify the 1995 Consent Decree to reflect the standard selected by EPA. These provisions of the 1995 Consent Decree clearly recognize EPA's authority to select a response action in accordance with the requirements of CERCLA.

Comment 26: *FWQC are not promulgated standards and thus cannot be applicable or relevant and appropriate requirements ("ARAR"). CERCLA requires that remedial actions comply with "any standard, requirement, criteria, or limitation under any Federal environmental law . . .or any promulgated standard, requirement, criteria, or limitation under a State environmental . . . law . . . [that] is legally applicable . . . or is relevant and appropriate under the circumstances." EPA's regulations interpret this statutory mandate as requiring that applicable and relevant or appropriate requirements be promulgated federal or state standards.*

EPA guidance documents state that promulgated standards are those that are legally enforceable and of general applicability (See Exhibit J). A standard or requirement is legally enforceable if it contains enforcement provisions, or is enforceable "by means of the general authority in other [relevant] laws." A standard or requirement is generally applicable if the requirement is "applicable to all circumstances covered by the requirement." There are various indications of promulgation including "statute number, date of enactment, and the effective date of the requirement." Advisory and guidance documents, non-binding policies, and standards not of general applicability cannot be ARARs.

FWQC are not promulgated requirements. They are non-enforceable guidance developed under Clean Water Act Section 304 and are used by the States to establish water quality standards under Section 303. They do not contain any enforcement provision of their own, and cannot be enforced by other laws unless they are adopted and promulgated as state standards. Without promulgation, they are unenforceable guidelines. Further, FWQC are not applicable to all circumstances covered by the criteria because they constitute nothing more than general guidelines to aid States in establishing their own water quality standards. FWQC also do not carry any of the indications of promulgation as they have no statute number, no date of enactment, and no effective date. As such, FWQC do not meet the requirement that, to be an ARAR, a requirement must be promulgated. It would, therefore, be inappropriate for EPA to use the FWQC as the copper or arsenic ARAR at the Blackbird Mine site.

Response 26: Section 121(d)(2) of CERCLA expressly requires that EPA evaluate specific factors to determine if the FWQC are relevant and appropriate. EPA has conducted such an

evaluation for iron, copper and arsenic and has determined that the FWQC are not relevant and appropriate under the circumstances of the release at this Site. Further discussion regarding this determination is contained in Chapter 13 of the ROD.

Comment 27: *Use of the FWQC for copper as the ARAR at the Blackbird site would be inappropriate because Idaho has promulgated a WQS for copper for the water bodies in question and FWQC are meant to be used only if a State fails to adopt its own standard. Two EPA guidance documents address situations where a FWQC and a state WQS are in conflict. EPA instructs that in such situations, the State WQS, and not the FWQC, should be used as the ARAR. In short, if "the State has promulgated WQSs for the specific pollutants and water body at the site," the state WQS is the proper ARAR, not the FWQC.*

The Idaho WQS for copper and arsenic should be applied at the Blackbird Mine site. Idaho has promulgated use designations for Panther and Big Deer Creeks, and has set water quality standards, including standards for copper and arsenic, for each of those uses. These WQS are specific to the particular creeks and have been duly promulgated by the State of Idaho. As such, they regulate Idaho water quality and are the proper ARAR for the Blackbird Mine site. Use of the FWQC for copper and arsenic at the Blackbird site would be inconsistent with EPA's established guidelines.

Response 27: EPA has determined that the State of Idaho water quality criteria are the appropriate cleanup standards for copper at this Site. EPA has determined that the FWQC for arsenic for human consumption of fish is relevant and appropriate for the protection of human health in Panther Creek, South Fork Big Deer Creek and Big Deer Creek. This determination is based on the fact that the designated beneficial use of these creeks includes aquatic life. The use designation for aquatic life increases the probability of human consumption of fish. Since the Federal AWQC for arsenic was specifically developed to protect human health related to consumption of fish, it is relevant and appropriate for Panther Creek, South Fork Big Deer Creek and Big Deer Creek.. Further information regarding this determination is contained in Chapter 13 of the ROD.

Comment 28*: The Idaho standard for arsenic in surface water for recreational uses is 50 µg/L. Because the state has promulgated a water quality standard for arsenic, the state standard should be applicable rather than the federal criterion. EPA has recommended that the national FWQC for arsenic in surface water of 0.14 µg/L (based on a 10^{-6} risk level) be applied to arsenic concentrations in Panther Creek, Idaho. This federal criterion for arsenic is not appropriate and relevant for the Blackbird Mine site and is currently under reassessment by EPA (U.S. EPA 1999). The national criterion is based on protection of human health from consumption of fish and shellfish that might accumulate arsenic from water. Several of the assumptions used in this default criterion, however, are scientifically inaccurate for site-specific exposure to arsenic in fish in Panther Creek. These assumptions include the bioconcentration factor, the relatively small amount of inorganic arsenic in fish tissue, the fish ingestion rate, and the target risk level.*

The bioconcentration factor for arsenic in fish tissue from arsenic in water (44) is based on an intake-weighted average of bioconcentration factors for finfish (1) and the eastern oyster (350). In 1997, the State of Idaho recalculated the human health criterion for arsenic in water to be 6.2 ug/L based on a bioconcentration factor that the state believed more accurately reflected the fish species found in state waters (i.e., trout) (62 Fed. Reg. 52925-52927). EPA accordingly withdrew the federal criterion (62 Fed. Reg. 52925–52927). The State has since revised this standard to 50 µg/L (IDAPA 58.01.02 210). Because ingestion of shellfish is unlikely from Panther Creek, Idaho's approach to selecting the bioconcentration factor for the species at the site is appropriate.

The bioconcentration factor is also based on total arsenic in fish, not on the relatively smaller fraction that is in the more toxic inorganic form. The amount of inorganic arsenic in fish tissue is likely less than 10 percent (See Exhibit F, Exposure to Inorganic Arsenic from Fish and Shellfish, Donahue and Abernathy, 1999). Addition of the small percentages of monomethyl and dimethyl arsenic forms (see Exhibit F) would still result in a relevant concentration of arsenic for risk assessment that is considerably less than 100 percent of the total arsenic concentration. A recent risk assessment conducted for the Duwamish River in Region 10 applied a 10 percent adjustment factor to measured total arsenic in fish tissue to account for the proportion of total arsenic present in toxic forms (Windward 2002). This factor was recommended in EPA comments provided on the work plan. Application of a 10 percent adjustment factor to the modified criteria identified by the State of Idaho in 1997 would result in an FWQC of 62 µg/L.

The federal FWQC value of 0.14 µg/L for arsenic is based on a carcinogenic risk of 10^{-6} , as explained in the footnote to the FWQC. "Alternative risk levels may be obtained by moving the decimal point (e.g., for a risk level of 10^{-5} , move the decimal point in the recommended criterion one place to the right)." The risk level selected by EPA for Panther Creek is inconsistent with other risk management decisions at the site, which have used a 10^{-4} risk level. Application of such a risk level to the FWQC would increase it by one hundred times.

By introducing the proposed arsenic FWQC as an ARAR after the FS Report was completed, EPA has provided no analysis of whether or not the FWQC could be achieved by any of the alternatives. The detection limit for arsenic (typically 1.0 ug/L) used during the RI is greater than the 0.14 ug/L FWQC for arsenic. Most of the arsenic analyses conducted during the RI were below the detection limit. However, several samples from Panther Creek collected upstream of Blackbird Creek and above any influence from the mine had detectable arsenic ranging from 1 to 4 ug/L. These results demonstrate that the FWQC is exceeded in background surface water and that the FWQC would not be met by any of the remedial alternatives.

In conclusion, using more appropriate factors (i.e., bioconcentration, fraction of inorganic arsenic, fish ingestion rates) to calculate a health-protective criterion associated with fish ingestion at Panther Creek would increase the site-specific value by more than 100 times over the FWQC value. Use of target risk levels consistent with other risk management decisions at the site would increase the value by 100 times again (i.e. greater than 1400 ug/L). Therefore, the more appropriate and relevant Idaho State standard of 50 :g/L is more than adequately protective of human health from fish ingestion in Panther and Big Deer Creeks. The federal

FWQC is exceeded in background surface water at the site and for this reason alone could not be used as a cleanup level. The Idaho standard is protective and is not exceeded in Panther Creek and Big Deer Creek either upstream or downstream of the mine. Therefore, there is no need for EPA to establish a cleanup level for arsenic in surface water.

Response 28: EPA has determined that the FWQC for arsenic for human consumption of fish is relevant and appropriate for the protection of human health in Panther Creek, South Fork Big Deer Creek and Big Deer Creek. This determination is based on the fact that the designated beneficial use of these creeks includes aquatic life. The use designation for aquatic life increases the probability of human consumption of fish. Since the Federal AWQC for arsenic was specifically developed to protect human health related to consumption of fish, it is relevant and appropriate for Panther Creek, South Fork Big Deer Creek and Big Deer Creek. EPA agrees with the BMSG comment that the FWQC value should be adjusted to reflect a 10^{-4} risk level that was used elsewhere at the Site and therefore is establishing the arsenic surface water cleanup level for Panther Creek, South Fork Big Deer Creek and Big Deer Creek at 14.0 ppb. Further information regarding this determination is contained in Chapter 13 of the ROD.

Comment 29: *In the proposed plan for the Blackbird Mine site, EPA has proposed the use of the most recent federal recommended ambient water quality criterion for copper (EPA, 1999) in lieu of the State of Idaho's water quality standard for copper, as the applicable surface water aquatic life cleanup level for Panther Creek, South Fork of Big Deer Creek, and Big Deer Creek. In addition to the legal objections noted above, the selection of the 1999 EPA recommended criteria is inappropriate because it is not necessary for protection of the aquatic community in the site streams.*

This error stems from two sources. First, at all ambient water hardness levels, the 1999 EPA recommended criteria for copper is lower than the State of Idaho's water quality standard. This occurs because the EPA's 1999 recommended criteria are more heavily weighted by daphnid data. Since this group of species does not occur in the streams in and around the Blackbird Mine site, additional protection for them is not appropriate.

Second, the 1999 EPA recommended criteria include an unrealistic hardness regression, which does not establish a lower limit on the hardness-criteria relationship. This generates a scientifically indefensible low copper criteria at water hardness less than 25 mg/l. How low water hardness affects copper toxicity and where the no-effect threshold occurs is a significant scientific issue. This issue was identified in the National Toxics Rule (NTR), which established a threshold of 25 mg/l for the hardness-criteria relationship. This threshold is included in the State of Idaho's water quality standards. Unless and until scientific data become available to justify another hardness level, maintenance of the 25 mg/l threshold is appropriate.

Additional detail in support of these conclusions is set forth below.

The two sets of values being considered as cleanup levels for copper for the protection of aquatic life in the streams at the Blackbird Mine site are the 1999 EPA recommended water

quality criteria and the current State of Idaho water quality standard. Each of these potential cleanup levels is described below.

The Idaho standard is based on a set of values established by USEPA, as specified in the National Toxic Rule (NTR). The copper criteria are expressed as two values which apply to different averaging periods – the Criterion Maximum Concentration (CMC) which is specified as a one-hour average and the Criterion Continuous Concentration (CCC) which is specified as a 24-hour average. Both the CCC and the CMC vary with hardness (i.e., the lower the hardness, the lower the criteria) and are specified by equations.

$$CCC = e^{\{mc[\ln(hardness)]+bc\}(CF)}$$
$$= e^{\{0.8545[\ln(hardness)]-1.465\}(0.960)}$$

Use of this equation yields the following criteria at various hardnesses:
at hardness = 100, CCC = 10.7
at hardness = 50, CCC = 6.07
at hardness = 25, CCC = 3.44

$$CMC = e^{\{ma[\ln(hardness)]+ba\}(CF)}$$
$$= e^{\{0.9422[\ln(hardness)]-1.464\}(0.960)}$$

Use of this equation yields the following criteria at various hardnesses:
at hardness 100, CMC = 15.8
at hardness = 50, CMC = 8.44
at hardness = 25, CMC = 4.51

Both the CCC and the CMC equations plateau at 25 mg/l and 400 mg/l hardness – i.e., for any hardness <25 mg/l, a value of 25 mg/l is inserted into the equation and for any hardness >400 mg/l, a value of 400 mg/l is inserted into the equation. This approach is taken because according to the NTR "criteria documents for metals do not include data supporting the extrapolation of the hardness effects on metal toxicity beyond a range of hardness of 25 mg/l to 400 mg/l (expressed as calcium carbonate)"(Fed Reg 12/22/92, p. 60871).

The 1999 EPA recommended criteria is a set of values established by EPA in 1995 and corrected in 1999. As with the Idaho standards, the 1999 EPA recommended copper criteria are expressed as two values which apply to different averaging periods (i.e., the CCC and the CMC) and both vary with hardness (i.e., the lower the hardness, the lower the criteria) and are specified by equations. The equations differ from those used in the Idaho standards by having a different value assigned to one of the input parameters (bc in the CCC and ba in the CMC).

$$CCC = e^{\{mc[\ln(hardness)]+bc\}(CF)}$$
$$= e^{\{0.8545[\ln(hardness)]-1.702\}(0.960)}$$

Use of this equation yields the following criteria at various hardnesses:

at hardness = 100, CCC = 8.53
at hardness = 50, CCC = 4.83
at hardness = 25, CCC = 2.74

$$CMC = e^{\{ma[\ln(hardness)]+ba\}(CF)}$$
$$= e^{\{0.9422[\ln(hardness)]-1.700\}(0.960)}$$

Use of this equation yields the following criteria at various hardnesses:

at hardness = 100, CMC = 12.6
at hardness = 50, CMC = 6.73
at hardness = 25, CMC = 3.59

In the 1999 EPA recommended copper criteria, there are apparently no limits on the application of the hardness extrapolation. Therefore, as the ambient water hardness falls below 25 mg/l, the criteria values continue to decrease.

There are two major differences between the Idaho water quality standard for copper and the 1999 EPA recommended water quality criteria. First, at all hardnesses, the 1999 EPA recommended criteria for copper are lower than those stated in the State of Idaho's water quality standards (and similarly in the NTR). For example, based on the data presented above, at an ambient water hardness of 25 mg/l, the CCC is 2.74 ug/l Cu under the 1999 EPA recommended criteria and 3.44 under the State of Idaho standards. A review of the underlying data indicates that the 1999 EPA recommended criteria are lower than the State of Idaho's standards due solely to the inclusion of more sensitive daphnid data into the database used to calculate the 1999 EPA recommended criteria. The inclusion of the lower daphnid toxicity test results drives the CMC and, consequently, the CCC to lower values. Since daphnids are not a component of the aquatic community found in the Blackbird Mine site streams, the use of the 1999 EPA recommended criteria is not necessary to protect the aquatic community.

The data demonstrating the paramount role played by daphnids in lowering the 1999 EPA recommended criteria are illustrated by comparing Table 3 of the 1996 Water Quality Criteria Updates (the basis for the 1999 EPA recommended criteria) with Table 3 of the 1985 EPA Ambient Water Quality Criteria document for copper (the basis for the NTR and, consequently, the Idaho water quality standards). In the 1995 document, two daphnid genera are rated first and second in sensitivity to copper, with genus mean acute values of 9.92 and 14.48 ug/l. In the 1984 document, the same two daphnid genera are rated second and third most sensitive, with genus mean acute values of 17.08 and 18.77 ug/l. Since the sensitivities of all other genera remain essentially unchanged, the calculations leading to the lower CMC and CCC values in the 1999 EPA recommended criteria are due solely to these revised daphnid sensitivities. The second major difference is that the 1999 EPA recommended criteria do not have a lower limit on the hardness regression, whereas the Idaho standard (and the NTR) does. At this time, the issue of the "plateauing of the hardness-toxicity relationship" has not been totally resolved. However, based on mechanistic considerations and limited empirical data, it is likely that the hardness-toxicity relationship levels off at low hardnesses. The exact threshold is unknown. In

the face of this uncertainty, the approach taken in the Idaho standards and by EPA in the NTR seems the most prudent. The selection of costly cleanup alternatives based on the possibility of slightly greater toxicity at hardnesses less than 25 mg/l is not warranted.

Response 29: The State provided comments on the Proposed Plan that provided further information documenting the protectiveness of the Idaho water quality criteria. These comments included a review of relevant copper toxicity testing with salmonids and site-specific studies relating threshold effects of copper. Based on this information, the State determined that Idaho's existing copper criteria, including a hardness cap at 25 mg/L, would be sufficiently protective of the aquatic life at the Site. EPA reviewed the State's analysis and has concluded that the State's determination is reasonable given the information that is currently available with respect to copper toxicity and the aquatic life expected to be present at the Site. Since EPA has determined that the State of Idaho water quality criteria for copper is the appropriate cleanup standard for copper at this Site, the assertions of the BMSG in this comment are no longer relevant. Further information regarding this determination is contained in Chapter 13 of the ROD.

Comment 30: *There is neither a State of Idaho standard nor an EPA ambient water quality criterion for cobalt. There is thus no standard for cobalt applicable to surface waters at Blackbird Mine. Nor is cobalt addressed in the 1995 Consent Decree. Accordingly, EPA should not be basing remedial goals and remedies on the presence of cobalt in surface waters. Undaunted by the absence of any published standard, however, EPA Region 10 has made one up just for the Blackbird Mine site. In particular, EPA has proposed a cleanup level (or PRG) for cobalt of 0.038 mg/l for the protection of salmonids, based on their "weight of evidence" evaluation of available data. A review of this proposed cleanup level and the underlying methodology used in its development clearly indicates that the proposed cleanup level is not appropriate, having been developed by an inaccurate evaluation of the available information and incorrect and unconventional manipulations of the available data. (See Exhibit G, Review of USEPA's Cobalt Toxicity Reference Value Position Paper & Responses to Comments, S.R. Hansen, Ph.D., September 11, 2002).*

EPA has inappropriately treated its cobalt PRG as a "threshold" criterion that must be met in order for an alternative to be considered for selection. As discussed below, no further reduction in cobalt is needed for protection of all life stages of salmonids in Panther Creek and Big Deer Creek. EPA's changes to the FS resulted in biasing the analysis of alternatives to imply that the only alternatives that would be protective of the environment are those that include collection and treatment of groundwater discharges from the West Fork Impoundment.

Two site-specific studies performed for the Blackbird Mine site clearly indicate that a cleanup level of between 0.124 and 0.213 mg/l would be appropriate for the protection of salmonids in streams in the vicinity of the Blackbird Mine site. (RCG/Hagler Bailly 1995, Hydroqual Lab 1996). The results of these studies are the most relevant in determining concentrations of cobalt that are safe for salmonids in the streams in question. In fact, the studies were designed specifically to identify the maximum concentration of cobalt that would be safe to the most sensitive life-stages of salmonids in the ambient waters found in streams at the Blackbird Mine site. The studies were performed by two independent scientific groups (one hired by EPA and

the other hired by BMSG). The test organisms were swim-up fry (the most sensitive life-stage of salmonids to metal exposure), which were exposed for up to 60 days to various concentrations of copper. The results from both tests were remarkably similar; indicating that there was no adverse impact to these sensitive test organisms at 0.213 mg/l in one test and 0.124 mg/l in the other test. Based on these results, it is clear that a cleanup level set at between 0.124 and 0.213 mg/l would be safe to salmonids in the streams at the Blackbird Mine site.

The conclusions drawn from the two site-specific studies are strongly supported by fish sampling in streams in the vicinity of the Blackbird Mine site. Recent fish sampling conducted at the site showed that juvenile chinook salmon and rainbow trout were utilizing lower Blackbird Creek (See Exhibit C, Beak/Golder 2002). Based on sampling conducted during the RI, the cobalt concentration at the mouth of Blackbird Creek is consistently higher than 0.213 mg/l under low flow conditions.

EPA has selected a cobalt cleanup level based on the Aquatic Risk Assessment dated August 27, 2001, and a Cobalt Toxicity Reference Value Position Paper dated August 14, 2001. We have attached detailed comments prepared by Dr. Stephen R. Hansen on the Cobalt Position Paper and responses to additional comments made by CH2M Hill on the subject during a March 21, 2002, meeting. (See Exhibit G). EPA identified cobalt toxicity reference values (TRVs) for the Blackbird Mine site, which are purported to be protective of threatened and endangered salmonid species (set at 0.038 mg/l) and their invertebrate food supply (set at 0.023 mg/l). Hansen's review of this document and the supporting scientific literature shows that both of these selected TRVs are inappropriate because they are based on (1) insufficient and misinterpreted data, and (2) unconventional and incorrect manipulations to reach apparently preconceived values.

Response 30: EPA agrees there is no ambient water quality criterion for cobalt nor other ARARs for cobalt in surface water. Under the NCP, when an ARAR is not available, remedial goals that are protective of human health and the environment must be set (40 CFR 300.430(f)(2)(i)). For the protection of the environment, assessments are to be performed and used to establish these levels (especially for sensitive and critical habitats of species protected under the Endangered Species Act). According to EPA's ecological risk assessment guidance, the best available science is used as part of the basis for the environmental assessment. The proposed cobalt cleanup level is based on the best available information and is neither inaccurate nor unconventional.

Since the toxicological and site specific data are limited and uncertain, EPA has applied uncertainty factors to its calculations to ensure that the cobalt PRG is protective of all life stages of salmonids. EPA has maintained that if the BMSG desires to modify the current cobalt remedial goal, it must be done on the basis of a well designed biomonitoring study in conjunction with and independently confirmed by a cobalt laboratory toxicity bioassay. The biomonitoring study design and data quality objectives need to be approved by EPA, and the toxicity bioassay conducted by an impartial third-party in order to be defensible. EPA's position regarding biomonitoring and toxicity testing was detailed in a letter to the BMSG dated April 22, 2002.

The two site-specific toxicity studies performed to date for the Blackbird Mine site do not clearly indicate that a cleanup level of between 0.124 and 0.213 mg/L would be appropriate. While the results of these two studies are relevant for determining acceptable concentrations of cobalt that are safe for salmonids in the streams in question, there are severe limitations with both of these studies that preclude the use of either without appropriate uncertainty factor(s). These limitations were discussed in meetings in March 2002 with the BMSG, as well as during conference calls preceding and following the March 2002 meeting.

The first endpoint of 0.124 mg/L is from a study conducted for only 14 days. The other endpoint of 0.213 mg/L is from a 60-day toxicity test that, according to data provided by the BMSG, utilized a resistant strain of trout. As discussed with the BMSG, the data indicate a wide range in sensitivities between different strains of rainbow trout. The BMSG inadvertently tested resistant as well as more sensitive strains. It is unknown whether the strains tested fully encompass the range of sensitivities that might be found if a test was designed to fully define intraspecific sensitivity. However, the intraspecific sensitivity strongly suggests that interspecific sensitivity would be at least as large. This supports use of an uncertainty factor to both of the endpoints proposed by the BMSG as cobalt cleanup levels.

The fish sampling referred to by the BMSG is the fish study that was conducted without an approved work plan, without regulatory oversight, and without any review of the methods used. The methodology presented in this fish study is inadequate. The results presented in the fish study are inconclusive. The raw data were not provided with the fish study; therefore, the results cannot be fully interpreted, nor conclusions independently verified.

The cobalt concentrations at the mouth of Blackbird Creek frequently exceed the proposed cobalt cleanup level, but concentrations in Panther Creek were below the cleanup level and had been for several months prior to the BMSG's fish study (see Table 5-9 in the ROD). The temporary presence of fish does not justify increasing cobalt cleanup levels, because it is unknown if these fish were permanent residents, or how long they had been in the vicinity. In addition, it is unknown if the habitat could sustain these fish on a long-term basis given the much higher cobalt concentrations that occur in Blackbird Creek and Panther Creek at times of the year other than when the BMSG conducted their fish study.

EPA has selected a cobalt cleanup level designed to be protective of salmonids and their food supply without being overly conservative. The invertebrate TRVs were used in the aquatic ecological risk assessment and suggested that some impacts could occur to invertebrate populations; in fact, invertebrate populations are suppressed in the areas impacted by mine-related wastes. However, EPA recognized that the PRG could be higher than the TRV and have adequate ecological function. EPA recognized that the invertebrate TRV could be overly conservative for the Panther Creek ecosystem, and that slightly higher concentrations could be considered protective. Therefore, the invertebrate TRVs identified in the aquatic risk assessment (dated August 27, 2001) were not used as cleanup level. In part this was because the invertebrate population data indicate that invertebrate populations have improved in Panther Creek. The BMSG's review of the aquatic risk assessment and cobalt toxicity reference value position paper (dated August 14, 2001) failed to demonstrate that the TRVs were inappropriate.

Furthermore, they are not based on insufficient nor misinterpreted data or unconventional or incorrect manipulations. See also EPA responses to Exhibit G of the BMSG's comments.

Comment 31: *One would expect that the errors in interpretation and calculation for the cobalt PRG would have been detected and corrected by peer reviewers prior to issuance of the Cobalt Position Paper. Perhaps contributing to these errors is EPA's apparent failure to follow its own guidelines for peer review in the establishment of these TRVs.*

EPA has published a variety of policies, including its policies for the Mandatory Agency-wide Quality System, the EPA Quality Manual, Peer Review and Peer Involvement at EPA, and the Peer Review Handbook. These policies have been ignored in preparation of the proposed plan.

In these policy documents, EPA has stated that it will strive to use (1) the best available, peer-reviewed science and supporting studies, and (2) data collected by the best available methods. EPA is supposed to have in place a quality management plan, to assign a quality assurance manager to conduct independent oversight of the quality system, and to conduct an assessment of data used to support agency decisions. These requirements also apply to EPA contractors. For significant work products, external peer review is to be used. No such peer review was undertaken by EPA Region 10 in developing the cobalt PRG.

EPA has also identified these peer review policies as a mechanism by which it will meet its data quality requirements under the Data Quality Act. Under this Act, EPA must ensure and maximize the quality, objectivity, utility, and integrity of all information it disseminates. The cobalt PRG is information covered by the Act because it is the communication of facts regarding the cobalt level necessary for salmonid protection. EPA disseminated this information to the public when it published the PRG in the Blackbird Site proposed plan. EPA must, therefore, ensure and maximize the objectivity of the cobalt PRG. EPA has stated that it will use its peer review policies and process to ensure the required objectivity. EPA's failure to undertake peer review prior to disseminating the cobalt PRG compromises the information's objectivity.

Response 31: Formal peer reviews are conducted on a case-by-case basis for scientific and/or technical work products that have been determined by EPA at it's discretion to be "major" work products. Major work products are typically those that are used to support a regulatory decision or policy/guidance of major impact. The BMSG mis-interprets and mis-states the EPA Peer Review Handbook. For example, the Handbook states on page 26 and 27 that "Scientific and technical work products that are <u>used to support a regulatory program or policy position</u> and that meet one or more of the following criteria are <u>candidates</u> for peer review...". In this case the cobalt TRVs and the cobalt PRG were developed for the Blackbird Mine site only considering site-specific conditions and were not used to support a regulatory decision or policy position. In addition, the cobalt TRVs were developed based upon review of data and analyses presented in existing literature and site-specific studies (one of which was performed by the BMSG). Thus, it is not necessary to utilize formal peer review since the underlying data in the existing literature have already undergone peer review. The cobalt TRVs and PRG were reviewed by scientists and technical experts from the State of Idaho, NMFS, the Forest Service and Forest Service

contractor, as well as the BMSG. The comments of the technical reviewers were considered in setting the cobalt cleanup level. EPA did use the best available science and supporting studies.

Comment 32: *In a September 7, 2001, technical memorandum on Remedial Action Objectives and Preliminary Remediation Goals for the Blackbird Mine Site (RAO/PRG memorandum), EPA correctly rejected the 0.023 mg/L TRV for benthic invertebrates because it was biased low due to the inclusion of daphnid data, recognizing that daphnids are not found at the Blackbird Mine site. However, EPA adopted the salmonid TRV of 0.038 mg/L as the PRG (and in the proposed plan as the cleanup level). In adopting the salmonid PRG the RAO/PRG memorandum states "It is also important that cobalt remain below a level of 50 ug/L, at which concentration it is known from site-specific toxicity testing to enhance copper toxicity to salmonids." Dr. Hansen's attached detailed comments (Exhibit G) demonstrate that the cobalt-copper interaction tests were incorrectly interpreted by EPA and, in fact, the test results showed no statistical difference in the toxicity of copper in the presence or absence of cobalt and that there is no evidence of additivity and/or synergism between cobalt and copper. It is apparent that available site data and literature data were selectively evaluated and manipulated in the Cobalt Position Paper in order to arrive at a cobalt TRV less than 0.050 mg/L.*

Dr. Hansen's review of the relevant literature demonstrates that EPA's proposed cobalt TRV of 0.038 mg/l for salmonids in Panther Creek is incorrect and that an appropriate salmonid TRV, based on site-specific data, should be set between 0.125 and 0.213 mg/l. Panther Creek and Big Deer Creek cobalt concentrations are consistently less than 0.125 mg/L at the present time. Therefore, there is no need for EPA to establish a cobalt cleanup level for the proposed plan. This finding is corroborated by the recent fish sampling in Blackbird Creek that showed juvenile salmon and trout are utilizing habitat with concentrations far in excess of EPA's proposed PRG. (See Exhibit C, Beak/Golder 2002.)

Response 32: As noted, it is true that the cobalt TRV for invertebrates was not used as the remedial cleanup level. Daphnia are ubiquitous in water quality criteria testing not only because they are sensitive, but because they are amenable to toxicity testing procedures and can be maintained in the laboratory. Several of the chronic water quality criteria make use of data from only three taxonomic groups, these groups being Daphnids, Amphipods, and Chironomids. Because of their sensitivity, daphnids and amphipods are used as "indicator" organisms. Their sensitivity relative to Panther Creek taxa is unknown due to the paucity of invertebrate data and because full life cycle tests with certain taxa such as mayflies are difficult to perform. However, because daphnia are not expected to inhabit the lotic ecosystem of Panther Creek, EPA acknowledged that water quality cleanup levels should consider, but not be heavily biased by, daphnia data. This qualitatively acknowledges their contribution to the available knowledge regarding toxicity. EPA has also acknowledged that by doing so, some invertebrate taxa may not be protected by the current remedial cleanup level for cobalt of 0.038 mg/L.

EPA has previously responded to Dr. Hansen's opinion that the cobalt/copper interaction test was incorrectly interpreted by EPA. EPA has acknowledged that the test results showed no statistical significance; however, a definite trend is apparent. EPA has reiterated the position of the authors

who performed and published the study. Further discussion on this point can be found in the responses to Exhibit G of the BMSG comments.

Dr. Hansen's review of the relevant literature fails to demonstrate that EPA's cobalt remedial cleanup level of 0.038 mg/L for salmonids in Panther Creek is incorrect. The data do not demonstrate that the cobalt cleanup level should be set between 0.125 and 0.213 mg/L, but demonstrate clearly that the cleanup levels should be set below 0.125 mg/L. The upper bound stated as appropriate by Dr. Hansen is from the 1996 Hydroqual test. The 1996 Hydroqual test would not be considered an acceptable test under EPA criteria derivation guidelines. EPA guidelines call for the rejection of any test that uses unusually sensitive or resistant organisms. There is sufficient reason to believe that the 1996 Hydroqual test used resistant organisms, leading to the rejection of the 0.213 mg/L value. The fact that sensitivity to cobalt appears to span nearly an order of magnitude within a single species is evidence to support use of an uncertainty factor applied to the lower bound value of 0.125 mg/L in order to account for interspecific and intraspecific variability.

The recent fish sampling in Blackbird Creek indicated that at the time sampling occurred, juvenile salmon and trout were utilizing this habitat. However, it is unknown how long these fish would remain in Blackbird Creek. These fish could have been seeking thermal refuge, and because the BMSGs fish study lacked temperature data, this is unknown. The mouth of Blackbird Creek is small enough that fish could move in and out in conjunction with changes in metal concentrations or temperature. The current BMSG fish study does not provide sufficient data to demonstrate that fish can inhabit these areas for extended periods at dissolved metal concentrations above the cobalt remedial cleanup level. See the responses to Appendix C of the BMSG's comments for further discussion of the limitations of the BMSG fish study.

Comment 33: *EPA arbitrarily proposes to establish a non-numeric aquatic life goal for Blackbird Creek "to support aquatic life at levels similar to that of nearby reference streams, although not necessarily to support salmonids or metals-sensitive macroinvertebrate species." Contrary to the Consent Decree, the State of Idaho's use attainability analysis and the Early Action work, this goal is for the first time identified in the July 1, 2002, Addendum to the Remedial Action Objectives and Preliminary Remedial Goals Technical Memorandum without any explanation to justify the goal. We note that the July 1, 2002, memorandum includes the phrase "…aquatic life at levels somewhat similar to that of nearby reference streams…" The word "somewhat" was dropped in the proposed plan, also without explanation. Whether the phrase is "similar" or "somewhat similar," the provision is hopelessly vague.*

As discussed above, State aquatic life use designations were removed from Blackbird Creek based on IDEQ's use attainability analysis. The only State use designation for Blackbird Creek is secondary contact recreation. EPA acknowledges this point in the July 1, 2002, memorandum, stating: "There is not a State water quality standard for Blackbird Creek because the State of Idaho removed the beneficial use designation for aquatic life for Blackbird Creek through a use attainability analysis." EPA acknowledges that numeric cleanup goals are not needed for protection of secondary contact recreation uses because existing metal concentrations are below levels that would be set for that purpose. EPA then inexplicably goes

on to state the vague, non-numeric goal for Blackbird Creek, based on aquatic life in a similar reference stream.

In addition to the fact that the non-numeric goal is contrary to existing regulations and the Consent Decree, it would not be possible to interpret the goal or to determine when it is achieved, without a serious potential for dispute by different parties and different scientists. There is no explanation how the phrase "similar (or somewhat similar) to that of nearby reference streams" would be interpreted by EPA or a court. Nor is there an explanation as to how "although not necessarily to support salmonids or metal-sensitive macroinvertebrate taxa" should be interpreted. If not salmonids, then what fish species? What macroinvertebrate species are expected and what is the designated use that they would provide?

The non-numeric goal for aquatic life in Blackbird Creek is ill-conceived and inconsistent with State and Federal regulations and should be deleted. We note that EPA correctly points out in the proposed plan that, because there are no designated beneficial uses for aquatic life in Bucktail Creek, cleanup levels for protection of aquatic life are not applicable. This is also the appropriate determination for Blackbird Creek.

Response 33: It is necessary to have at least a non-numeric goal for aquatic life in Blackbird Creek for at least two reasons. EPA originally had planned to set numeric goals in Blackbird Creek to ensure that Panther Creek was protected. The non-numeric goal was developed in response to BMSG's concerns about such numeric goals in Blackbird Creek based on the uncertainty of the effectiveness modeling. Such a non-numeric goal was designed to ensure that remedial actions are selected so that water quality in Blackbird Creek will be improved such that cleanup levels are not exceeded downstream in Panther Creek. In addition, it is important that any remedial action not adversely affect the existing habitat in Blackbird Creek that has ecological benefits. There is considerable habitat in Blackbird Creek that can support some aquatic life (see BMSG fish study in Exhibit C), and it is likely to be able to support more aquatic life when the water quality is improved through implementation of the remedial actions. Therefore, the non-numeric goal is consistent with the NCP and the requirement to select remedies that are protective of the environment and that maintain protectiveness over time.

The Use Attainability Analysis (UAA) for Blackbird Creek prepared by the State of Idaho must be revisited every 3 years. The conclusions of future UAAs may not be the same as the current UAA, and the use designations may change in the future as the water quality improves in Blackbird Creek.

EPA agreed that cleanup levels were not applicable for Bucktail Creek, not because there were no beneficial uses for aquatic life, but because the small size and steep gradient of Bucktail Creek provide virtually no habitat for fish, and very limited habitat for benthic invertebrates. This is not the case for Blackbird Creek, in which the BMSG reportedly has found fish and some limited benthic macroinvertebrates.

Comment 34: *In finalizing the Feasibility Study (FS), the EPA without explanation rewrote the evaluation (Chapter 7), making major changes from the version submitted by Golder Associates*

for the BMSG. The EPA altered the evaluation substantially so as to bias it to support selection of alternatives BB-7 and BT-5. As part of these comments, the BMSG is resubmitting Chapter 7 (see Exhibit A) so that the Administrative Record contains an appropriate evaluation that should have been used in selecting remedial alternatives for the proposed plan.

Response 34: EPA submitted detailed comments on the initial draft of the FS and on the draft final version of the FS. In addition, EPA's comments were discussed at length during meetings and teleconferences following the submittal of comments on the draft and draft final versions of the FS. Because of concern over the proper inclusion of EPA's comments on Chapter 7, EPA requested that the BMSG prepare and submit for review a revised Chapter 7 incorporating EPA's comments on the draft final FS prior to submitting the remainder of the final FS. Based on our review of this revised Chapter 7 (which was the third version of Chapter 7 prepared by the BMSG), it became apparent that the BMSG was resistant to incorporating EPA's comments appropriately. Rather than continue with the comment and response procedures, EPA determined that it would be more efficient to re-write portions of Chapter 7 to appropriately incorporate previous EPA comments.

Comment 35: *With respect to the evaluation in Chapter 7, the EPA changed the assumed removal percentages used in the post-remediation concentration estimates. In particular, the EPA assumed significantly lower cobalt reduction due to a soil/clay cover over the West Fork Tailings Impoundment. This change resulted in the EPA's concentration estimates for cobalt being higher than Golder's calculations. The EPA used their higher cobalt concentration estimates to support selection of alternative BB-7 over alternative BB-6. However, Golder's calculations show that alternative BB-6 would also meet EPA's cobalt PRG in Panther Creek. However, as discussed earlier in these comments, the BMSG disagrees with EPA's cobalt PRG and believes that current water quality is protective.*

EPA made changes to Golder's post-remediation concentration calculations without documenting any basis for the changes. The differences are shown in the attached table (Table 1, Differences in Removal Percentages). With respect to post-remediation cobalt concentrations, Appendix D (Table D-5) of the FS, as approved by EPA, gives the following "cumulative predicted reduction": low – 34%, intermediate – 48%, high – 69%. In the Golder version of the concentration prediction tables in Chapter 7, these values were used (rounded) for the "minimum," "best estimate," and "maximum" estimated removal percentages due to the overall cover. Golder and EPA held many discussions on the modeling presented in Appendix D. EPA and BMSG experts held a detailed discussion of the modeling, and the results of this discussion have been documented in the BMSG response to comments (on a draft FS) dated April 22, 2002. By approving the final FS with this appendix, the EPA has documented their acceptance of the validity of Appendix D. The uncertainty in the data and the modeling is noted by Golder and the BMSG, but Appendix D presents the best available information on the potential effects of a soil cover on the West Fork Tailings Impoundment. Therefore, it was inappropriate for EPA to ignore or modify the information in Appendix D in its calculations of predicted cobalt calculations.

Rather than straightforward use of the Appendix D predicted reductions, and without any documented basis, the EPA used the low predicted reduction as the "best estimate," used the intermediate reduction as the "maximum," and ignored the high predicted reduction. EPA made similar changes to the "soil cover (no clay)" removal percentages (which correspond to the "3-m soil" predictions in Table D-5). Thus, EPA has selectively ignored information in the approved Appendix D, created new predictions without providing any basis, and uses the predicted reductions in an arbitrary manner inconsistent with EPA's presentation in the Appendix.

EPA's arbitrary changes to the FS resulted in biasing the analysis of alternatives to imply that the only alternatives that would be protective of the environment are those that include collection and treatment of groundwater discharging from the West Fork Impoundment and biasing the evaluation against those that rely on the soil cover to reduce cobalt loading.

Response 35: EPA agreed with many of the estimated removal efficiencies that were proposed by the BMSG in developing the water quality predictions for the various alternatives (see Table 7-9 from the FS). However, as noted in the response to the BMSG's comment 36 below, there is a very large degree of uncertainty in the output parameters of the hydrogeochemical model developed for the West Fork Impoundment cover. Because of this degree of uncertainty, EPA determined that the cobalt removal efficiencies assumed by the BMSG were overly optimistic. Thus, EPA developed its own estimate of cobalt removal efficiencies based on a review of the water quality data, a review of the hydrogeochemical model, and best professional judgement. Specifically, EPA determined that the "Minimum" cobalt removal efficiency should be based on the worst case scenario–hydraulic reductions only and no geochemical reductions. EPA determined that the "Maximum" cobalt removal efficiency should be based on the predictions of the model. The best estimate then fell between the minimum and maximum. The estimates for treatment efficiency for seepage collected at the West Fork Impoundment were also changed to reflect the typically lower treatment efficiencies that can be achieved with passive treatment systems compared to active treatment systems.

Comment 36: *In Section 7.2.1.1 of the FS report and elsewhere in Chapter 7, EPA included a discussion of the uncertainties associated with the predictions made in the modeling of reduced cobalt loads that would be attributable from a soil cover at the West Fork Tailings Impoundment. While the BMSG acknowledges that there is uncertainty in some of the input parameters and assumptions used in the modeling, the analysis shows that reductions in infiltration and oxidation rates will reduce cobalt loadings. Therefore, the EPA's statement in the FS that "It is uncertain whether the cover/cap will be effective at reducing cobalt loads at all" is not correct.*

Response 36: EPA provided extensive comments on the results of the modeling included in Appendix D of the FS. As noted in those comments, with any effort to model complex hydrogeochemical processes, it is difficult to develop a model that can provide accurate predictions of real-world occurrences. This is especially true if the model has been developed using assumptions or default values for many of the input parameters because field information is not available. The BMSG had ample opportunity to collect the field information necessary to

provide a properly calibrated model. However, the BMSG chose not to collect additional field information for this calibration. The lack of appropriate calibration means that the outputs from this model, especially for the reduction in cobalt due to the geochemical impacts of the cover at the West Fork Impoundment, have a very large degree of uncertainty. In addition, as noted in Appendix D, any reductions in cobalt loads resulting from the cover may have already occurred. Because of the degree of uncertainty in terms of predicted cobalt load reductions, EPA maintains that it is possible that the cover may result in no significant cobalt load reductions.

Comment 37: *A correct use of the loading reduction information is shown in Table 7-10 of the attached Section 7 of the FS (See Exhibit A). This analysis shows that both BB-6 and BB-7 are predicted to meet EPA's cobalt PRG using "best estimate removal" predictions. Under worst case minimum removal predictions, neither BB-6 nor BB-7 would be predicted to meet EPA's PRG. Using EPA's flawed logic, this would mean that neither of the alternatives would be protective.*

Response 37: As noted in the response to the BMSG's comment 35 above, EPA does not agree that the removal efficiencies developed by the BMSG are appropriate. Referring to Table 7-10b of the FS, the "best estimate removal" predictions indicate that Alternative BB-7 would meet the cobalt water quality goal in Panther Creek under virtually all normal conditions. However, the predictions included in Table 7-10b indicate that Alternative BB-6 would not meet the cobalt goal in Panther Creek during significant portions of the year. Of particular concern is the prediction for Alternative BB-6 for "Var. Max." under the "best estimate removal" scenarios. The Var. Max predictions are based on percentage reductions from the existing cobalt concentrations typically experienced during the winter and early spring months, when cobalt concentrations in Panther Creek are highest. The predictions in Table 7-10b of the FS indicate that Alternative BB-6 would not meet the cobalt water quality goal in Panther Creek during significant portions of the winter and early spring months.

Regarding the worst case minimum removal predictions, these were developed to provide the "error bars" to define the range of the possible predictions. They are based on worst case scenarios of maximum loadings and minimum removal efficiencies simultaneously, and do not necessarily represent the worst case water quality that could occur in the future. EPA evaluated the alternatives considering all of the information presented in the water quality predictions, recognizing that there is uncertainty in the predictions of potential future water quality for each of the alternatives. EPA judged that it was more likely that Alternative BB-7 will meet the water quality goals on a consistent basis than Alternative BB-6. In addition, EPA judged that it was more certain that the treatment associated with Alternative BB-7 would meet the cobalt water quality goals in an acceptable time frame.

Comment 38: *Finally, as discussed in the FS, it may take a decade or more for the full reductions to be seen from the cover on the West Fork Impoundment. EPA has inappropriately linked the time for achievement of the cobalt PRG to the Consent Decree schedule as a means to essentially disregard the predicted long-term benefits of BB-6 for cobalt removal. Cobalt is not a requirement of the 1995 Consent Decree. The full benefit of the Early Action should be considered from a technical standpoint, without using a predetermined schedule.*

Response 38. Since both copper and cobalt adversely affect a stream's ability to support all life stages of salmonids and related benthic communities, it is important to simultaneously achieve reductions of both metals. Since copper water quality goals are expected to be achieved by 2005 and it is technically practicable to meet cobalt goals by 2005, EPA believes that it is appropriate to implement actions that achieve cobalt reductions in the same timeframe. As noted in Appendix D to the FS, the cobalt reductions resulting from the cover may not be apparent for "years or tens of years". In addition, as noted in the response to the BMSG's comment 36, EPA's position is that it is possible that no additional cobalt reductions may occur as result of the cover. EPA is not willing to allow the cobalt remedial level to be exceeded for years or tens of years to determine when (or if) the cover can be adequately effective.

Comment 39: *As discussed in detail in these comments, EPA's cleanup goal of 38 ug/L for cobalt is arbitrary and unwarranted. The existing concentrations in Panther Creek are consistently below any cleanup goal that can be justified based on site data. Recent fish monitoring performed by the BMSG show that all life stages of salmonids are already supported in Panther Creek downstream of the site. There is no justification for further remedial action to address water quality for cobalt. Moreover, EPA has not shown that the proposed remedial action constitutes "cost effective and reasonable best management practices."*

Response 39: See responses to comments 2, 16, 17, 30 and Appendix C. The ROD shows that the proposed remedial action is cost effective in meeting the threshold criteria of protection of human health and the environment and provides the best long-term effectiveness.

Comment 40: *There is no valid basis for selecting alternative BT-5 for the Bucktail Creek Drainage. EPA's proposed alternative BT-5 includes a pipeline for diversion of Bucktail Creek surface water around South Fork Big Deer Creek. Bucktail Creek currently discharges to South Fork Big Deer Creek approximately one-half mile upstream of its confluence with Big Deer Creek. EPA states that water quality goals could be achieved in South Fork Big Deer Creek under alternative BT-5. However, South Fork Big Deer is not covered by the Consent Decree, and moreover there is no basis for this water quality conclusion. Surface flows in Bucktail Creek greater than the approximately 10-year thunderstorm event would discharge into South Fork Big Deer Creek. As noted in Chapter 7 of the FS report, the discharge of groundwater associated with Bucktail Creek or other sources could prevent the achievement of the extremely low copper WQC in South Fork Big Deer Creek. (See Exhibit A). In fact, natural pre-mining conditions in South Fork Big Deer Creek likely have exceeded the copper WQC.*

Response 40: The fact that the South Fork Big Deer Creek is not covered by the 1995 Consent Decree is irrelevant (see the responses above concerning this issue). EPA must choose alternatives that meet the water quality cleanup levels for the area streams, unless no feasible alternative can be developed that meets those goals and the site meets the criteria for an ARAR waiver. EPA is choosing Alternative BT-5 for the Bucktail Creek drainage, primarily because it is the only alternative that can meet the water quality remedial cleanup levels (which is an ARAR for copper) for the South Fork Big Deer Creek. The water quality predictions for all of the other alternatives indicate that the other alternatives would exceed the water quality remedial cleanup levels by factors of up to about 12 times the remedial cleanup levels (see Table 7-11b in

the FS). In addition, Alternative BT-5 is the only alternative that could meet the copper water quality standard, which is an ARAR.

It is true that surface flows in Bucktail Creek greater than approximately the 10-year storm event would be discharged to the South Fork Big Deer Creek. However, the 10-year design event is the threshold. In other words, Bucktail Creek flows would not be discharged until flows exceeded the design capacity of the bypass pipeline. Thus at flows in excess of the 10-year event, most of the Bucktail Creek flows would still be bypassed around the South Fork Big Deer Creek. It would take an event considerably larger than the 10-year event to result in significant Bucktail Creek overflows to the South Fork. As noted in Chapter 7 of the FS, these overflows would occur during times when the flows in the South Fork would likely be significantly higher than normal. Thus the increased South Fork flows would likely provide additional dilution, such that the effects on water quality would be minimized and of short duration.

Chapter 7 of the FS indicated that groundwater or other sources could prevent achievement of the water quality goals in the South Fork Big Deer Creek, even after natural recovery of the in-stream sediments. However, Chapter 7 also indicated that, if these sources resulted in future exceedances of the water quality remedial goals, EPA would evaluate contingencies to address the groundwater or other sources.

There is no evidence that natural pre-mining conditions resulted in exceedances of the water quality standard in South Fork Big Deer Creek. In fact, recent water quality monitoring at the background station on the South Fork (upstream from Bucktail Creek) indicates that metals concentrations are consistently below detection limits (except for some samples with questionable QA/QC).

Comment 41: *No environmental benefit would be gained by attempting to achieve water quality goals in South Fork Big Deer Creek. Recent fish sampling performed by the BMSG found no fish in South Fork Big Deer Creek upstream or downstream of Bucktail Creek. It is poor fish habitat. Natural physical barriers (log jams and water falls) inhibit the colonization of fish in South Fork Big Deer Creek from Big Deer Creek. (See Exhibit C, Beak/Golder 2002). Disturbance of the Bucktail Creek drainage due to performing BT-5 would likely to be more harmful than the status quo.*

Response 41: The NCP obligates EPA to meet or waive the State water quality standard for copper ARAR as a threshold criteria. An ARAR waiver cannot be justified. EPA believes that the BMSG failed to find fish in the South Fork of Big Deer Creek downstream of Bucktail Creek due to levels of metals in the surface water that are toxic to fish, rather than due to any habitat limitations. The absence of fish in the South Fork upstream from Bucktail Creek may also be due to the significant migratory barrier caused by the metals from Bucktail Creek. The South Fork of Big Deer Creek is a sufficiently large stream that it could provide habitat for some small fish as well as for macroinvertebrates. Furthermore, the information provided in Exhibit C indicates that some habitats are rated as moderate rather than poor and that physical barriers would not preclude fish colonization of South Fork of Big Deer Creek. Therefore, the water quality remedial goals are applicable to the South Fork Big Deer Creek. The environmental

disturbance to the Bucktail Creek drainage resulting from construction of a buried pipeline along an existing roadway would be minimal, temporary, and easily mitigable.

Comment 42: *There is a possibility that placing Bucktail Creek in a pipeline could actually increase copper concentrations in Big Deer Creek. South Fork Big Deer Creek historically acted as a sink for dissolved copper that was released from Bucktail Creek. The Early Action reduced copper loading such that reductions in copper concentrations in South Fork Big Deer Creek have not been observed in recent years. Over the long term, natural removal processes such as precipitation reactions or adsorption of copper onto sediments or organic materials can be expected to result in a net loss of dissolved copper in South Fork Big Deer Creek. These process would not be likely to occur in a pipeline that, under alternative BT-5, would convey Bucktail Creek water to Big Deer Creek. In summary, the additional cost and environmental disturbance that would be caused by construction of a pipeline under alternative BT-5 is not justified.*

Response 42: EPA disagrees that bypassing Bucktail Creek around the South Fork Big Deer Creek would result in increases in copper concentrations in Big Deer Creek. The geochemical processes (such as precipitation and adsorption) that reduced copper concentrations in the South Fork of Big Deer Creek, occurred primarily prior to the Early Actions, when concentrations of copper were much higher in the South Fork. As noted in the comment, since the completion of the Early Actions, copper reductions have not been observed along the South Fork Big Deer Creek, probably because the copper concentrations in the water column no longer exceed the solubility limits for the typical precipitates. The implementation of the remedial actions will further reduce the copper concentrations in Bucktail Creek waters. This means that it is very unlikely that significant reductions in copper concentrations would be observed along South Fork Big Deer Creek (due to precipitation and/or adsorption) if one of the other action alternatives were selected by EPA.

The additional cost of construction of the bypass pipeline is small compared to the cost estimates for the overall remedial actions (approximately 6 percent of the estimated total net present worth of Alternative BT-5). The bypass pipeline would be constructed along or within an existing roadway for much of its length. Thus, the environmental impacts of pipeline construction would be short term and would be mitigated comparatively easily.

Comment 43: *In Section 6 of the FS, EPA has included possible "contingent actions" that might be evaluated by EPA if the selected actions do not meet remediation goals in an acceptable time frame. This type of 'catch all' listing of contingent actions is not appropriate. As discussed in the forgoing comments, the actions already performed at the site have made major reductions in the metals releases from the site and may already provide protection of all life stages of salmonids in Panther Creek.*

Through identification of contingent actions in the FS and the proposed plan, EPA appears to be planning on a never-ending series of follow-up studies for employment of its staff and contractors. Operation and maintenance and monitoring requirements for the Early Action and additional work already performed by the BMSG will ensure that the system continues to operate as designed.

Response 43: See response to Comment 12. The contingent actions are not related to operation and maintenance or ensuring that the system continues to operate as designed. As noted in the FS and the ROD, there is uncertainty concerning the predictions of effectiveness of some of the remedial actions, particularly relative to the water quality. The contingent actions would be evaluated only if the remedial actions do not consistently meet the remedial cleanup levels.

Comment 44: *The goal is the protection of all life stages of salmonids in Panther Creek and Big Deer Creek. That goal is being achieved as evidenced by the report of fish populations in Panther Creek. Achievement of this goal is more important than the achievement of arbitrary surrogate numeric cleanup levels, which we dispute. Any future actions should not be based on the absolute achievement of numeric cleanup levels, but rather on sustaining salmonids in Big Deer Creek and Panther Creek.*

Response 44: One of EPA's remedial action objectives is protection of all life stages of salmonids in Panther Creek and Big Deer Creek. EPA does not agree with the BMSG's fish study conclusions and how the BMSG is using the conclusions of the fish study (see other EPA responses on the fish study and Exhibit C). In order to achieve the above remedial action objective, EPA established a range of measurable standards, including biological goals, narrative goals and numeric goals. The numeric goals that are being required for this cleanup are required by federal and state ARARs. The copper cleanup level is established by the State water quality standards. The cobalt cleanup level is established through a risk-based analysis. This analysis is necessary to establish a cleanup level that assures protection of human health and the environment. It is also necessary to establish a numeric cleanup level to satisfy the NPDES requirements of the CWA.

Comment 45: *EPA also made arbitrary changes to Section 3.1.1.1.3 and other sections of the FS regarding the applicability of NPDES requirements to discharges from the Blackbird Site. NPDES is an applicable requirement to discharges from the water treatment plant and the culvert discharge from the West Fork Tailings Impoundment. Both of these discharges are to Blackbird Creek not to Panther Creek. The beneficial use designation for Blackbird Creek is secondary contact recreation, not cold water biota. Existing standards for the treatment plant, which are set at technology-based limitations (and the discharge from the impoundment culvert), meet the secondary contact criteria in Blackbird Creek. No further analysis should have been required by EPA to assess compliance with NPDES requirements. Nevertheless, as part of the evaluation of alternatives in the FS, EPA required that we conduct mixing zone analyses (Appendix B in the FS) to evaluate whether alternatives could sufficiently reduce copper concentrations from all sources (not just the point sources subject to NPDES requirements) discharging into Blackbird Creek. This was done to address FWQC in Panther Creek, not Blackbird Creek. This type of mixing zone analysis is a misapplication of the NPDES requirements. Mixing zone analyses are intended to be used for point source discharges into receiving waters, and not for evaluations of one creek mixing with another creek.*

Response 45: The Clean Water Act (CWA) requires an NPDES permit for all point sources that discharge pollutants to waters of the U.S. Point sources include any discernible, confined and

discrete conveyance from which pollutants are or may be discharging. This includes, but is not limited to, discharges from the water treatment plant, the Westfork Tailings Impoundment and other contaminated materials.

The CWA and NPDES regulations require that effluent limitations in the permit must be stringent enough to maintain state water quality standards. Effluent limits, therefore, are developed based upon the water quality criteria that is protective of the use of the receiving water. The Blackbird mine site point sources discharge directly to Blackbird Creek, therefore Blackbird Creek is the receiving water of concern. Panther Creek is also a receiving water of concern since Blackbird Creek flows into Panther Creek just a few miles below the point source discharges. Effluent limits in NPDES permits must be protective of the beneficial use of the receiving water and any more stringent downstream uses.

The Idaho state water quality standards specify the beneficial use of Blackbird Creek as recreational and the beneficial use of Panther Creek as cold water biota. Currently the concentrations of copper and cobalt in Panther Creek exceed water quality criteria (copper) and risk-based criteria (cobalt) that is protective of the cold water biota use.

The traditional approach under the CWA for addressing point sources in impaired waters is to develop a total maximum daily load for the impaired water body. The TMDL allocates individual wasteload allocations for each point source that discharges to the water body. The wasteload allocations are then incorporated as effluent limitations in the NPDES permits for the point sources. Where a TMDL is not available, as is the case for Panther Creek, effluent limits are developed based on meeting water quality criteria at the point of discharge. In other words, no mixing zone is allowed. No mixing zone is allowed since the receiving water(s) already exceed the criteria and therefore no "clean" water is available to dilute an effluent that discharges at concentrations higher than the criteria. Rather than using this traditional approach, EPA is proposing to allow a mixing zone in Panther Creek for the discharges, since Panther Creek is expected to meet water quality standards after the cleanup of the Site.

A mixing zone was appropriately applied to calculate acceptable loading from the point sources in Blackbird Creek to Panther Creek. This mixing zone must allow an adequate zone of passage for fish and must be carefully monitored.

Comment 46: *EPA has previously concluded that the extensive removal actions already performed for Panther Creek overbank deposits prevent risks to human health under current uses. However, EPA postulates that, under hypothetical future residential use scenarios, very low future risks on several private properties could occur. As the BMSG has extensively commented in the past, EPA's method of calculating potential risks seriously overestimates any risks posed by the low concentrations of arsenic that remain in these remote overbank deposits. EPA's exposure assumptions make the unrealistic assumption that all of a person's outside residential activities would occur only on these selected locations. This is not realistic. The BMSG does not agree that any further removal actions or institutional controls are needed for the Panther Creek overbank deposits.*

The BMSG has submitted comments throughout the HHRA process at the site (see Exhibit H, comment letters dated March 26, 1998, July 21, 1998, February 22, 1999, March 24, 1999, June 18, 1999, September 27, 1999, June 28, 2001, August 14, 2001). For the most part, EPA has not responded or disagreed with these analyses submitted by the BMSG, but the HHRA is nonetheless inconsistent with the conclusions reached in the BMSG comments.

Response 46: The exposure areas that were evaluated for the Panther Creek overbank deposits represent areas that may be contacted regularly by human receptors. Although some of these exposure areas are small, they are located in areas that may be attractive to children playing by Panther Creek or other recreational users of the creek. The goal of the HHRAs is to estimate risks for reasonable maximum exposure conditions. Since it is possible that children or other receptors may limit their activities to these designated areas along the creek, risks were calculated for these exposure areas as a reasonable maximum exposure scenario. Using these reasonable maximum exposure assumptions, potential future risks for three private properties (assuming full-time residential use of the properties) exceed EPA's acceptable risk range. Therefore, future removal actions or institutional controls are needed for these properties.

Numerous meetings and conference calls were held between EPA and the BMSG about the exposure assumptions used in the HHRAs for the Panther Creek Inn and the Panther Creek overbank deposit areas. These meetings and conference calls included discussions about the exposure area data groupings.

EPA disagreed with the BMSG's recommendations for exposure assumptions during these meetings and conference calls and consequently, EPA did not change the exposure area assumptions used in the risk calculations. However, based on the BMSG's comments, text was added to the uncertainty section of the HHRAs to explain the uncertainties associated with risk estimates based on small exposure areas.

Comment 47: *The BMSG has commented on the unrealistic assumption of 60% bioavailability and has provided site-specific data (2 separate studies) documenting lower bioavailability at the site (Golder 1996 and Exponent 1998). The in vitro biaccessibility study conducted by Exponent indicated that the probable site-specific relative adsorption factor for arsenic is no higher than 0.13, indicating an approximate 5-fold overestimation of potential risk using EPA's adsorption factor of 0.60.*

Response 47: EPA has included a discussion of the site-specific bioavailability studies that were conducted by Exponent for the BMSG in the uncertainty section of the HHRA. As stated in the HHRA, no corresponding animal studies were conducted with these in-vitro bioavailability studies. Because of the limitations of these site-specific studies (no corresponding site-specific animal studies), the results were not used in a quantitative manner in the HHRA. The uncertainties associated with using the EPA Region 10 default value (0.60) in the risk calculations was discussed in the uncertainty section of the HHRA.

Comment 48: *Most of the soil samples from within the exposure areas evaluated in the risk assessment were originally collected to determine the presence or absence of mine-related*

materials. As such, the samples were collected in depositional zones or other areas most likely to contain mine-related materials and elevated metal concentrations, ignoring areas where the presence of mine-related materials was unlikely. These samples were biased toward locations with higher metals concentrations and are not representative of the larger exposure areas evaluated in the risk assessment. For example, in the assessment of potential future residential scenario, EPA assumes that the entire exposure period for future residents would occur on the few small depositional areas where arsenic concentrations exceed 100mg/Kg. This is not a realistic assumption.

Response 48: See the response to the BMSG's comment 46 for a discussion of this issue.

Comment 49: *In previous comments, the BMSG and its consultant, Exponent, have recommended that the assessment of short-term noncancer risk to young children should incorporate a short-term reference dose for arsenic rather than the chronic reference dose based on lifetime exposure. Since our previous comments, discussion of a short-term arsenic reference dose for children has been elevated to a national level and several additional evaluations and reviews of a short-term reference dose for arsenic have been released. All of these evaluations recommend a short-term reference dose for less than 7 years of exposure that is about 10 times higher than the dose (0.0003 mg/kg-day) used by EPA Region 10 in its risk assessment for the Blackbird Mine.*

These current studies include a review by EPA Region 8 (2001), aided by an EPA/ATSDR Interagency Work Group, which received external peer review from three scientists. (See Exhibit I, Arsenic Toxicity Factor References). This review recommended a lowest-observed-adverse-effect level (LOAEL), of 0.05 mg/kg-day and an acute and subchronic reference dose of 0.015 mg/kg-day for less than 7 years of exposure. A national recommendation for the short-term reference dose is currently being considered by EPA under the direction Dr. Peter Grevatt.

A short-term reference dose for arsenic was also considered by EPA's FIFRA Science Advisory Panel in October 2001 in evaluating the short-term risks of arsenic exposure from treated-wood play structures to children (See Exhibit I, Odiott and Roberts 2001). The panel recognized a high level of confidence in 0.05 mg/kg-day as a LOAEL, based on the scientific literature. The panel's recommendations for a protective level for children was a short-term reference dose of either 0.002 or 0.005 mg/kg-day.

A more recent evaluation of the literature was presented this summer at the 5th International Conference on Arsenic Exposure and Health by scientists from Exponent, EPA, Gradient, and the local health agency in Denver (See Exhibit I, Tsuji, et al. 2002). The findings of this review were that based on the LOAEL of 0.05 mg/kg-day, a protective level for children would be no less than 0.005 mg/kg-day.

Response 49: As noted in the comment, a national recommendation for the short-term reference dose for arsenic is currently being considered by EPA. However, at this time, there is not yet a recommendation from EPA at the national or Region 10 level of the appropriate value to use for a short-term reference dose for arsenic. The suggested short-term reference doses

described in this comment have not been officially adopted by EPA and guidance has not been published for their use. Therefore, it is not appropriate to use these values in the estimation of potential noncancer health effects from arsenic at the Blackbird Mine Site. Irrespective of which reference dose is used, a potential cancer risk is shown at the three private properties along Panther Creek, as discussed below in the response to comment 50.

The sub-chronic reference dose report is based on a *Lowest Observed Adverse Effect Level* (LOAEL) for skin lesions at a dose of 0.05 mg/kg-day. Two uncertainty factors were applied to this LOAEL to derive the recommended sub-chronic reference dose (RfD) of 0.005 mg/kg-day (i.e., one-tenth of the LOEAL). The uncertainty factors were based on inferring a *No Observed Adverse Effect Level* (NOAEL) from the LOAEL and limitations of the database including the potential for neurological and cardiac effects.

There are specific concerns regarding the protectiveness of applying the sub-chronic oral reference dose to childhood exposures. Studies describe five fatalities in children aged 2-7 years at doses estimated between 0.05 - 0.13 mg/kg-day. Additional concerns are based on prolonged cardiac dysrhythmia and liver dysfunction following intravenous infusions of arsenic trioxide in acute promyelocytic leukemia patients at doses of 0.06 - 0.12 mg/kg-day. Because these fatalities and other serious adverse health effects occur in young children at, or close to, the LOAEL for skin lesions, it is reasonable to question the protectiveness of the sub-chronic RfD.

Comment 50: *The correct application of the above information by EPA in the Human Health Risk Assessment would show that the future residential use scenario for Panther Creek properties would not result in unacceptable potential future risks. As such, there is no need to consider future removal actions or institutional controls on Panther Creek properties.*

Response 50: Three private properties along Panther Creek have concentrations of arsenic that result in risk estimates that exceed EPA's acceptable risk range for the future full-time residential scenario (Rogers, Strawn/Bowman, and Rufe). Both the potential cancer risks and noncancer Hazard Indices exceed EPA's acceptable ranges (i.e., 1×10^{-6} to 1×10^{-4} for potential cancer risks and a Hazard Index of 1 for potential noncancer health effects). Use of the subchronic reference dose for the child scenario would not affect the potential cancer risk estimates; these potential cancer estimates would still be greater than 1×10^{-4}. Therefore, additional actions or institutional controls are required to address the unacceptable potential cancer risks.

Comment 51: *BMSG comments on EPA's Aquatic Ecological Risk Assessment referenced above have shown that the toxicity reference values used in the evaluations of potential risks posed by sediments were unrealistically low. The cobalt reference value was based on a single data point, an approach which is not sufficient to evaluate toxicity thresholds. Literature values for arsenic and copper were used incorrectly in the risk assessment as potential indicators of risk when those values could only appropriately be used to rule out probable effects (see June 29, 2001 comments, Exhibit D). The risk assessment failed to consider that metals in site sediments were likely to have very low bioavailablity based on their presence as sulfides or their adsorption or co-precipitation with iron oxides, organics, or other materials. The unrealistic*

reference values were further evidenced by the fact that background concentrations of arsenic, copper and cobalt each exceeded the toxicity reference values in the risk assessment.

Recognizing the presence of background concentrations of metals, EPA set cleanup levels based on a consideration of background rather than on the assessment of risks. However, the cleanup levels fail to consider the full range of background concentrations. As such, the cleanup levels frequently exceed natural background concentrations of metals. Furthermore, the risk assessment process failed to establish that any risk is posed to aquatic organisms if the background concentrations are exceeded. There is an implication in the proposed plan that a risk from sediments exists if metals concentrations exceed the cleanup levels. That is simply not the case.

EPA has acknowledged in its own risk assessment that risks from sediments are unlikely. In the July 17, 2001, draft final Aquatic Ecological Risk Assessment, CH2M Hill stated for both Panther Creek and Big Deer Creek that "based on the low dietary HQs and the uncertainty associated with establishing background UTLs …, it is unlikely that sediments are causing potential adverse effects to the aquatics system." EPA and/or CH2M Hill deleted this acknowledgement as to Panther Creek without explanation in the final risk assessment issued on August 27, 2001. However, the same discussion for Big Deer remained in the final document.

The alternatives proposed by EPA rely primarily on natural recovery of in-stream sediments. The BMSG agrees that this is the correct approach for in-stream sediments. However, the proposed plan should make it clear that there is no known risk to aquatic organisms at the concentrations currently existing in the in-stream sediments.

Response 51: EPA has discussed the sediment toxicity reference values in the Aquatic Ecological Risk Assessment at length with the BMSG, in both meetings and conference calls. The best available data were used to develop sediment toxicity reference values. Different approaches were considered. EPA considers that the sediment toxicity reference values were used appropriately. There is inadequate evidence to support the BMSG's claim regarding bioavailability. The BMSG could have conducted sediment toxicity bioassays to reduce uncertainty but apparently chose not to do so.

The fact that the upper tolerance limit for background concentrations of arsenic, copper, and cobalt exceeded their respective toxicity reference values is not evidence that the toxicity reference values were inappropriate. It is, in fact, possible that there are some locations where naturally occurring levels of metals could produce adverse biotic effects. This does not mean that the toxicity reference value(s) is inappropriate. However, it is appropriate for EPA to consider the ambient conditions in establishing cleanup levels. Generally, under CERCLA, cleanup levels are not set at concentrations below natural background levels.

EPA set sediment cleanup levels considering background concentrations including evaluation of potential risks. The background concentrations did consider the full range of potential background values based on data available at the time.

It was not the intent of the risk assessment to determine risk due to background concentrations, rather the risk assessment attempted to determine acceptable metal concentrations in the environment regardless of source (i.e., whether they were background or site related concentrations). EPA notes the additional discussion regarding the aquatic risk assessment, and that the BMSG agrees with the EPA's plan to allow for natural recovery of in-stream sediments. However, the data simply are not adequate by which to state with any justification that there is no known risk to aquatic organisms due to exposure to in-stream sediments. EPA has proposed natural recovery of in-stream sediments with the knowledge that hydrologic and geochemical conditions existing in Panther Creek and Blackbird Creek will eventually reduce sediment concentrations.

Comment 52: *The State of Idaho and the United States on behalf of the EPA and other federal agencies brought lawsuits seeking injunctive relief, response costs and damages relating to Blackbird Mine. Those claims were resolved in a global settlement that was, after notice and a public comment period, approved by the Court in 1995. The BMSG agreed to undertake certain obligations specified in the Consent Decree, and in return the United States and the State agreed to release the BMSG with respect to all matters raised in the lawsuits. See ¶¶ 5 and 85.*

Paragraph 5(c) of the Consent Decree is very specific concerning the obligations of the BMSG with respect to water quality. It provides that the water quality standard for copper as set forth in the BRCP shall be achieved by 2005 to achieve a level of water quality in Panther Creek and Big Deer Creek sufficient to sustain salmonids through all life stages.

A consent decree is a court order embodying the terms agreed upon by the parties as an alternative to litigation. It is well settled that "consent decrees are construed as contracts" and are enforced as such. Consequently, if a party breaches a term of a consent decree, that action is a breach of contract. If EPA were to utilize the FWQC to establish different cleanup goals for copper in surface water, or to add pollutants or streams not described in the Consent Decree, and thereby to attempt to materially and unilaterally change the obligations of the BMSG, that would be a breach of contract.

The Consent Decree was entered into between the parties after extensive negotiation generated agreement over the precise terms. Consent decrees embody the compromises of the parties and the meaning of the decree is ascertained by looking within the four corners of the document. Further, when interpreting the requirements of a consent decree, "the explicit language of the decree is given its plain meaning and is afforded great weight."

EPA's proposed plan goes well beyond the requirements of the 1995 Consent Decree, in terms of pollutants covered, specific standards, and water bodies covered. The 1995 Consent Decree resulted from a consensus that appropriate water quality goals should focus on attaining copper standards in Panther Creek and Big Deer Creek. A considered decision was reached not to address other streams, such as Blackbird Creek, where attaining water quality goals was not deemed feasible. Similarly, the Consent Decree imposes obligations only with respect to copper, not other pollutants.

In contrast, EPA's proposed plan contains water quality goals for cobalt and arsenic, pollutants not specified, and addresses streams such as Blackbird Creek and South Fork Big Deer Creek that are not specified in the Consent Decree.

When the 1995 Consent Decree was negotiated, the BMSG also negotiated a presumptive remedy, called an Early Action, which was set forth in a separate 1995 Administrative Order on Consent (AOC). The Early Action agreement and the Consent Decree, taken together, were intended to define the BMSG's obligations. The Early Action represented the best judgment of the BMSG and EPA, with the approval of the Trustees, regarding the response actions necessary to achieve the water quality goal for copper set forth in the Consent Decree. The Early Action process was used, rather than a Record of Decision (ROD), in order to expedite cleanup actions at Blackbird Mine and in particular to improve water quality for copper sufficient to sustain salmonids in Panther Creek and Big Deer Creek.

The BMSG recognized that EPA would probably wish to issue a ROD in the future, but the expectation of the BMSG and the agencies, as discussed in the negotiations, was that the ROD would conclude that no further action was necessary, based on the work performed in the Early Action. The issuance by EPA of a ROD was left open as an option to "fine tune" or supplement the Early Action if needed to address the water quality goals in the Consent Decree, namely to attain water quality for copper sufficient to sustain salmonids in Panther Creek and Big Deer Creek. It was not contemplated by the BMSG that EPA would embark on a lengthy, expensive, open-ended Superfund process that ignores or supercedes the goal of creating water quality for copper sufficient to sustain salmonids in Panther Creek and Big Deer Creek. It was not contemplated by the BMSG, nor expressed by any of the governmental representatives, that the ROD might change the water quality standard for copper, or impose requirements for pollutants other than copper, or require remediation of streams other than Panther Creek and Big Deer Creek. In short, the ROD was not intended to change the requirements of the Consent Decree.

That is not to say that EPA has no authority or options. EPA may elect to address pollutants or streams not covered by the Consent Decree and implement remediation for those pollutants and streams using monies provided by the U.S. Superfund fund and the State. Alternatively, using the modification provision of the Consent Decree, ¶¶ 93 and 94, the Consent Decree may be modified by agreement of all of the parties. However, EPA may not unilaterally impose new obligations upon the BMSG.

Response 52: As discussed in previous responses to comments, EPA disagrees with the BMSG's representations and interpretations of the 1995 Consent Decree and the Administrative Orders. In the 1995 Consent Decree, the BMSG agreed to perform both response actions and restoration actions at the Site. The 1995 Consent Decree focuses on the restoration goals and clearly recognizes that the remediation of the site will be performed by the BMSG separately pursuant to separate administrative orders or consent decrees not covered by the Consent Decree. As further mentioned in above responses, the 1995 Consent Decree does not limit EPA's responsibility to select a response action for this Site and that such response action is expected to comport with the requirements of CERCLA.

Comment 53: *In conclusion, EPA's plan is inconsistent with the 1995 Consent Decree and ignores the significant benefits produced by the Early Action and additional work undertaken by the BMSG. It is based on arbitrary remediation goals not justified to sustain salmonids. EPA compounds its error by using erroneous (in the case of cobalt) and nonexistent (in the case of arsenic) analyses of the performance of remedial alternatives.*

Response 53: See all the responses to comments above.

EPA Responses to Exhibit C

General Response:

The BMSG conducted a fish study in August 2002. The results of that fish study can be found in Exhibit C of the BMSG's comments and are not reproduced in this responsiveness summary. There are numerous and serious limitations regarding the BMSG's fish study as it is presented in Exhibit C. With these limitations, the conclusions made by the BMSG from the data presented in this Exhibit are unsubstantiated. EPA does not agree with the conclusions of the fish study. The limitations of the fish study are enumerated in the General and Specific comments below.

1. The BMSG's fish study was conducted without EPA oversight and without a workplan approved by EPA. Performance of a fish study was discussed between the BMSG and EPA in two meetings during the spring of 2002. EPA stated in the meetings that such a study would be useful in establishing post-early action and pre-remedial action conditions and should be performed under EPA oversight as part of the CERCLA process (i.e., 1994 RI/FS AOC). The BMSG failed to notify EPA of their plans to perform the study and did not involve EPA and other stakeholders in the planning and implementation process. Therefore, the data cannot be considered impartial.

2. The methodology as presented is inadequate to determine if appropriate quality assurance procedures were followed. The methodology as presented is also inadequate to determine why some locations were sampled quantitatively while others were sampled qualitatively.

3. The data presented are inadequate to determine if the study is conclusive, or even suggestive. For example, while the BMSG states that dietary preferences were investigated by analyzing some fish unintentionally killed as the result of electroshocking, it is unknown how many fish of each species were analyzed. There are no statistics presented; therefore, it is unknown how reliable these results might be. It is therefore unknown if enough fish were collected to make a definitive statement regarding feeding habits. Thus, while the BMSG's data are indicative of improved conditions, the data are definitely not conclusive that Panther Creek and Big Deer Creek are capable of supporting all life stages of salmonids.

4. Prior to the fish survey there was a failure in the outlet structure of the clean water reservoir on upper Blackbird Creek. This failure released potentially large numbers of fish downstream.

This release confounds the BMSG's fish study, as it could skew the population data significantly. This release is not discussed in Exhibit C.

5. The data in the fish study represent only one sampling point in time. Because of this, the data are not sufficient evidence to determine the current or future state of fish populations in the impacted area creeks.

6. Water quality data apparently were not collected in conjunction with the fish data. Metal concentrations are low in August in Blackbird and Panther Creeks, the time during which the fish survey was conducted. This could have affected the status of fish populations in Blackbird and Panther Creeks. The fish study data are inadequate to determine if fish occupy these habitats year round, or if peak concentrations of cobalt or copper produce elevated levels of mortality or morbidity, temporarily reducing populations or altering fish communities.

7. The BMSG fish study found several types of salmonids in Panther Creek, including Chinook salmon. There was a large release of adult Chinook salmon in 2001 for angling, and these fish apparently spawned. The rate of spawning success is unknown, and the location of the redds that successfully produced young is unknown. For any study to be meaningful for conclusions regarding Chinook salmon reproductive success, several generations would have to be studied. Natural fish populations must demonstrate that they can reproduce successfully from year to year in Panther Creek. Repeatability is very important for any type of population survey. The BMSG also found, handled, and photographed an adult wild Chinook. This was possibly outside of the legal limitations regarding their collection permit, which specifies that these animals shall not be harassed.

8. There are several factors that may mask or confound relating fish populations to metal concentrations:

- Upstream-downstream changes in fish habitat, temperature, etc. Streams change upstream to downstream and so do their uses by fish;

- Evaluation of appropriate reference sites on different but similar streams (e.g., tributaries to the Salmon River) in addition to the upstream-downstream comparisons would provide more definitive results. The study did not include a reference drainage(s) with similar habitat for comparison, which severely limited its usefulness and precludes drawing the conclusions at the end of Exhibit C;

- The report makes unfounded statements regarding the distribution of spawning and juvenile Chinook salmon. Spawning could have been affected by temperature or salmon could have spawned but none survived due to metal concentrations. The distribution of fish does not necessarily reflect the distribution of spawning;

- Sculpin are probably a better instream indication of metal contamination in streams than are trout. Sculpin need to be sampled by electrofishing, and not by snorkeling; thus, this weakens any comparisons to the IDFG data to establish trends over time.

9. It is important to consider the populations of other fish and macroinvertebrates in addition to salmonid populations when making decisions regarding Panther Creek and mining-related impacts. Macroinvertebrates and sculpin would serve as better bioindicators or sentinels of ecological effects since salmonids can be highly migratory, making it difficult to interpret chronic toxicity, presence/absence, and other population effects. Less mobile species are better reflective of site or local conditions.

Specific Responses:

Page 1. A reference was lacking for the IDFG redd count and chinook salmon stocking. Information regarding redds and their locations is critical to evaluating salmonid reproductive success.

Page 3. First Paragraph. The methodology regarding fish surveys was not explicit. For example, the first paragraph states that survey work in Panther Creek was conducted using standard methods for estimating fish populations and fish condition as well as for assessing stream habitat. The references for these methods were not provided. The exact method applied to estimate fish populations, estimate fish condition, as well as assess stream habitat, was not stated. It is not clear if similar habitats were sampled at each site, and it is not clear that a uniform method such as a consistent unit of effort was used at each site. The data are not necessarily comparable between locations, since similar collection methods and sampling efforts in water bodies of similar size must be performed. These limitations and their potential impact on the resulting data and conclusions are not discussed.

It is not clear if the major habitats (riffle, pool, run) were sampled at each location; it is not apparent if the proportion of each habitat type sampled were comparable between locations. Precision, accuracy, and completeness of the data were not evaluated. Replicates were not collected in order to define variability. Data reproducibility was not determined. From the text throughout the results section, it appears that locations above points of confluence with Blackbird Creek were relied upon as 'reference' locations. However, this was not clear and was lacking in the Methods section. The selection process of the various locations for reference locations is critical in performing any data comparisons for effects analysis. Because this information was lacking in the methodology, the adequacy and representativeness of the results cannot be determined, and the conclusions are misleading and uncertain.

Page 3. Fourth paragraph. This paragraph states that quantitative sampling was carried out by sampling 150 to 300 square meter sections of the creek. The text is not clear concerning how locations were selected for qualitative versus quantitative sampling. The methods failed to state how the size of the section sampled was selected and the effect of the number of passes of the backpack electrofisher on the resulting data.

Page 3. Fifth paragraph. This text failed to describe the methods for scale collection, and the quality assurance methods that were applied. The location of scales collected for salmonids is critical for the aging process. Random duplicates are critical to the QA process as well, and apparently were not collected.

Page 3. Sixth paragraph. It is not clear as to the methods for the qualitative sampling that were applied. The decision process for identifying locations for quantitative vs qualitative evaluation was not stated. The supporting data for the qualitative locations is not provided since the Appendices only provide the quantitative information. This paragraph indicates that additional locations for qualitative analysis were identified, in order to capture habitats not characterized in the quantitiative stations. However, the text does not indicate which habitats were missed in the quantitative locations. The rationale for location selection was not clearly described.

Page 3. Seventh paragraph. The report failed to explain how specimens were selected for weighing and measurement. It is unclear if this process was random or if this could have introduced significant bias into the results. The records for the sweep electrofishing seconds by sampled reach were not provided.

Page 3.5. Figure 1. The information concerning why a significant number of the PAF upstream locations (CCFO.1, PAF39.7, PAF36.2, PCF0.1, MCF0.1) were identified as 'qualitative' sampling locations was not provided.

Page 4. First paragraph. While the fish condition method appears relatively straight forward, the reference for this method was not provided, nor any comparison to other methods to justify selection of one method as opposed to another.

Page 4. Third paragraph. The methods applied to the habitat surveys are not clear. If habitat surveys are going to be used to justify the population level effects, this information is critical. It is not clear what level of effort was expended to perform habitat surveys. While qualitative ratings are used to describe the spawning, rearing, overwintering, and adult feeding and holding habitats, it is not clear what the scale is for these ratings. This appears highly subjective. In addition, within this paragraph defined measures of instream cover, substrate composition and habitat composition were described. However, it is not clear how these measures were incorporated into the study results of 'Fish Habitat' (page 9). It appears that these measures were never interpreted in the results presented in the study.

Page 5. Fourth paragraph. The comparison of this electrofishing study to the IDFG snorkel study does not make sense. The methods, objectives, and resulting data from the two studies are distinctly different. There is no purpose to complete this type of comparison.

Page 5. Last paragraph. The information regarding fish densities with respect to the water treatment plant discharge was not clear. Densities are presented for periods when the treatment plant was not discharging and for time periods when the effluent was present, but there is not enough information provided to determine if this is meaningful. Confounding factors include the effluent discharge over time prior to the fish sampling effort, how long the treatment plant had been discharging when density data were collected, and the period of time that was allowed to elapse after discharge ceased before density data were collected again.

Beginning with this subsection (3.2.1), and continuing with each tributary subsection (3.2.2 through 3.2.3), the qualitative locations identified in each tributary were not described. The rationale for the selection of the qualitative locations (presumably to characterize a habitat type not sampled within the quantitative locations, but this is not described) was lacking. It appears that the South Fork of Big Deer Creek was entirely qualitative characterized. There are no supporting data within the Appendices to Exhibit C to support these findings.

Table 4. The biomass value for 'All Fish' for the Panther Creek PAF24.0 location value was not presented in the raw data provided in Appendix 3. This value could not be verified.

Page 6. The third paragraph indicates that benthic macroinvertabrates appeared to be sparse in Blackbird Creek. The text states that fish condition did not appear to be affected. It is unknown how long these fish had been in Blackbird Creek. The statement does not indicate how many fish were measured for condition. The release from the clean water reservoir upstream could have released numerous healthy fish into Blackbird Creek, as well as diluted surface water metal concentrations. These are confounding factors that severely compromise the results and conclusions.

Page 6. Fifth paragraph. Downstream of South Fork of Big Deer Creek, trout densities were lower despite the occurrence of apparently good habitat conditions. This is likely the result of metal loading from the South Fork of Big Deer Creek. The next paragraph is conflicting as it states that trout were abundant in Big Deer Creek, except where the South Fork empties into Big Deer. EPA notes that this strongly suggests that the South Fork of Big Deer Creek is impacting water quality and fish habitat in Big Deer Creek.

Page 7. Sculpin were absent at station PAF10.4 which is downstream of the mouth of Big Deer Creek. This, coupled with the paucity of number and diversity of fishes in Big Deer Creek below the South Fork, indicates water quality problems persist in Big Deer Creek.

Page 7. With regards to biomass measurements, it is possible that the fish had only been in Blackbird Creek for a few days or weeks, seeking thermal refuge. Rainbow trout and Chinook salmon are fairly mobile, and can exhibit migratory movements. The data are inadequate to determine fish movement and the corresponding duration of exposure. Biomass measurements are standardized to 100 square meter areas, although the size of each location sampled differed significantly. It is unclear how the variation in the size of the area sampled affected the results.

Page 7. First paragraph. The statement that fish likely entered Big Deer Creek from Panther Creek, indicating Big Deer Creek was not causing a strong avoidance reaction at the time of sampling, is not justified. Chinook salmon density was lower in Big Deer Creek than in Panther Creek. Chinook density was lower than upstream areas as well.

Page 7. Second paragraph. The densities of fish from the South Fork of Big Deer confluence to station SFF0.5 upstream of Bucktail Creek were obviously influenced by metal loading. Despite the fact habitat conditions were considered to be poor, metal loading was the most significant factor in the lack of fish.

Table 4. There were no sculpin species or mountain whitefish observed in either Blackbird Creek or Big Deer Creek. This appears to be true for both the quantitative and qualitative samples. This is likely related to the elevated metal concentrations.

Page 8. Young of the year (YOY) Chinook salmon dominated in Blackbird Creek. This may be a result of fish seeking thermal refuge in Blackbird Creek from Panther Creek. It is impossible to determine if YOY salmon were seeking temperature refuge since temperature profiles for each system were not provided or temperature data were not collected. The size classification data collected in this study was not compared to other similar streams in the region, thus making the data inconclusive.

The data obtained from the scale samples are never presented in the document. The QA methods were not provided. Observations of variability in the aging method were not provided.

Paragraphs 1 and 8 both refer to comparisons to reference reaches. These reference reaches were never clearly identified, thus these conclusions could not be verified.

Table 5. The fish condition vs. measures of habitat quality vs. measures of biomass are not consistent. For instance, locations within Big Deer Creek demonstrated some of the highest biomass measures, yet yielded low Fish Condition factors (1.01). It is not clear if this is due to the age class distribution or some other factor.

Page 9. Paragraph 1. The conclusions were impossible to verify as the data used to derive the conclusions were not adequately presented.

Page 9. Subsection 3.8. This entire subsection calls out very critical habitat features which prohibit fish occurrence. Lack of integration of these observations into the conclusions for each tributary and apparently conflicting information precludes a comprehensive understanding of the controlling factors affecting the ecology of each system. For instance, page 11 indicates that Big Deer Creek upstream of South Fork Big Deer, generally has excellent rainbow trout/steelhead production conditions; however page 9 indicates that past river mile 0.7, this tributary is blocked by waterfalls.

Page 9. The sizes and numbers of each fish species that were examined for diets needs to be documented. Small chinook fry compared with 10-inch rainbow could account for the results of the apparent dietary differences. In addition, the diet of different species of fish may vary even for fish of similar size. It is unclear if enough fish were sampled to have any confidence in the results because no statistics are provided. Furthermore, the fact that these are electrofishing mortalities introduces a bias to the sampling effort and raises a question of whether the samples were random - it is possible that stressed fish succumbed to electroshocking stress in which case the diet may not be reflective of that of healthy fish.

Page 10. Paragraph 1. Statements regarding increasing trends as they relate to Idaho Fish and Game data are inaccurate and misleading. Although there is an apparent increase in the IDFG dataset, the densities still remain extremely low.

Page 10. Paragraph 2. It is inappropriate to compare four-pass electrofishing to snorkeling. Each technique has demonstrated biases. Numbers, sizes and species observed can vary widely with each technique depending on experience, equipment limitations, and the site sampled. In snorkeling sampling efforts, <70 mm fish are not eliminated from the data sets by IDFG, whereas they are in electrofishing sampling.

Page 11. These rankings were intended as a relative measure and were initially established by the Northwest Power Planning Council (NWPPC). These rankings may not apply to Panther Creek. It was inappropriate to use this ranking system without discussion and research in order to determine its applicability to the Panther Creek watershed.

Page 12. Upstream limitations are not cause for lack of fish in Big Deer Creek below South Fork of Big Deer since fish could easily wash down and are more abundant upstream.

Page 12. Although Blackbird Creek did have rearing fish present, the data are inadequate to determine that the habitat is supporting all life stages of salmonids, or is capable of supporting fish throughout their life cycle. It is unknown if the results are repeatable over multiple years, particularly in the absence of stocking. The fresh water flush from the clean water reservoir and summertime rains recorded in July/August could make water quality conditions temporarily suitable for rearing.

Pages 12 and 13. The conclusions from one objective were not linked to other applicable objectives. For instance, the last paragraph under Objective 1 indicates that fish were not found in South Fork Big Deer…, while under Objective 2 the habitat conditions within South Fork Big Deer appear to be the controlling factor. The conclusions are stated as fact, when in reality there are so many issues associated with each tributary that these conclusions are unfounded on the basis of the limited sampling effort performed.

Pages 12 and 13. Data trends observed by tributary were not addressed. For instance, there is a tremendous surge in biomass bracketed by PAF locations 19.2 and 19.5 which occurs above and below Deep Creek. This indicates that Deep Creek is perhaps affecting habitat quality.

Page 13. The applicability of the habitat quality criteria conclusions is seriously in question as the application of the criteria was out of context because it was established for steelhead streams that do not have significant numbers of resident rainbows. Without additional research and discussion, these conclusions are invalid.

Page 13. The 'Additional Conclusions' do not appear to be supported by any data provided within this report, and the data are lacking by which to verify them.

Appendix 1

This appendix differs from the Habitat Survey methods described in the document. It appears that two separate types of habitat measures were completed. The raw data for the instream cover, bottom substrate and habitat composition (described on page 4) were not provided. The

methods for this Appendix were not described within the text of the report. It is also not clear as to how the results from this Appendix were incorporated into the conclusions of the report.

Table A1. A column which describes possible controlling factors affecting the presence and distribution of the habitat types was not included. It appears from the text that certain tributaries are valley confined, and contain falls features that affect the habitat distribution.

Appendix 3.

Definitions and example calculations for each variable (biomass vs. biomass catch) were not provided. A review of the data presented in the tables of this appendix was completed using the raw data presented, as part of the document review by EPA. However, the calculations of the biomass catch in some cases could not be verified. Data gaps were identified; for example, the SD for bull trout is missing on the calculated biomass results for BBF0.1 and the Biomass for 'all fish' for PAF24.0. There is no description of how values of Total Biomass, and Biomass were "estimated by proportion" for BBF 0.0. These limitations severely limit the usefulness of this appendix, and cast the conclusions into further question.

There are numerous sources of uncertainty associated with the calculations for certain locations that may have posed problems during electroshocking events. For instance, locations BDF0.0 and PAF 24.0 did not demonstrate a very steep rate of diminishing return for each sweep. If this was due to access, the presence of multiple barriers, or other factors, it was not discussed. The reasons for four sweeps completed for PAF10.4 was not provided.

Response to Exhibit G of BMSG's Comments

Introduction

Exhibit G of the BMSG's comments presents a summary of the BMSG's position regarding the cobalt water quality cleanup level that has been established by EPA at 0.038 mg/L. The BMSG's position has been primarily provided by S.R. Hansen and Associates, a consultant to the BMSG. The cobalt water quality cleanup level has been the subject of correspondence and meetings among the EPA, BMSG, State of Idaho, and natural resource Trustees. The most significant of these include:

- *Cobalt Toxicity Reference Value Position Paper*, prepared by CH2M HILL for the EPA on August 14, 2001. This position paper provided the rationale utilized by EPA in setting the cobalt water quality cleanup level.

- *Review of Cobalt Toxicity Reference Value Position Paper*, prepared for the BMSG by S.R. Hansen and Associates, March 19, 2002. This review presented the BMSG's initial position regarding EPA's water quality cleanup level.

- A meeting among the EPA, BMSG, State of Idaho, and natural resource Trustees, held in Boise, Idaho on March 27, 2002. EPA's cobalt water quality cleanup level and the BMSG's

position regarding the cleanup level were discussed at this meeting. Also at this meeting, Dr. Carolyn Fordham of CH2M HILL presented EPA's response to the BMSG's position provided in the BMSG's March 19, 2002 review of the *Cobalt Toxicity Reference Value Position Paper*.

- The Microsoft Powerpoint™ presentation used to summarize EPA's response at the March 27, 2002 meeting was provided to the BMSG. The BMSG made minor revisions to their review of EPA's *Cobalt Toxicity Reference Value Position Paper*, apparently based on information provided in EPA's Microsoft Powerpoint™ presentation. This revised review, dated September 11, 2002, is provided in Exhibit G.

- EPA prepared a summary of its position on the cobalt water quality cleanup level and a response to the BMSG position first iterated in the March 19, 2002 review. This is included in Attachment 1 to these responses to Exhibit G comments. Attachment 1 is a summary of the Microsoft Powerpoint™ presentation used by EPA at the March 27, 2002 meeting and includes an explanation of how the cobalt water quality cleanup level was established and a point by point response to the BMSG's March 19, 2002 review.

The specific responses included below focus on the information in Exhibit G that was not presented in the original March 19, 2002 BMSG review. This portion of Exhibit G provides additional technical comments by the BMSG on EPA's position concerning the cobalt water quality cleanup level as presented by EPA in the March 27, 2002 meeting. These additional technical comments are titled "Response to Ms. Fordham's Comments" and begin on page 9 of Exhibit G. EPA considers these to actually be additional comments (rather than responses) by the BMSG and has treated them as such in the specific comments and responses below. There was a non-technical comment that was also provided in Exhibit G addressing peer review (see the comment beginning on page 7 of Exhibit G). This comment is essentially the same comment as the BMSG's comment 31 from Volume 1 and is addressed in EPA's response to comment 31.

Specific Responses

Comment 1. *Page 9, Issue 1. EPA used values from several studies by which to derive the cobalt PRG. Among these were two papers by Birge et al. (1978 and 1980). The BMSG has repeatedly commented that the Birge et al. values should be rejected from consideration as part of the cobalt TRV.*

Response 1. The BMSG's primary concern in this comment is that the raw data are not presented in Birge's published paper. Often raw data are not presented in published papers in peer-reviewed journals. The lack of these data do not make the resulting endpoints incorrect. The prevailing lack of cobalt toxicity information argues against rejection of this paper. Dr. Birge has apparently offered the BMSG evidence that the two endpoints are based on the same underlying data. Even if the 1980 and 1978 papers evaluate the same data sets and come up with slightly different toxicity endpoints due to different statistical methodology, the more recent of these studies (i.e., the 1980 document) should be retained. The fact that these data

were mentioned but not used in the existing water quality criteria for another metal is irrelevant to the cobalt TRV, which is not a national water quality criterion.

Comment 2. *Page 10, Issue 2. This issue involves the Acute Chronic Ratio (ACR) derived by EPA from the BMSG Hydroqual (1996) data. This value was obtained by dividing the average of the acute LC50 values by the chronic NOEC value (0.213 mg/L). The BMSG maintains that the ACR developed from their own data for salmonids exposed in Panther Creek water is too high, and that it would be more appropriate to use an ACR developed from data for fathead minnows. EPA notes that a high ACR will provide a more conservative (i.e., lower) cobalt remedial goal.*

Response 2. EPA used the BMSG study (Hydroqual, 1996) in developing the cobalt PRG. This study exposed rainbow trout for a period of 60 days to cobalt in water collected from Panther Creek. There were also acute toxicity tests run concurrent with the subchronic 60 day test; however, these were run with different strains of rainbow trout, among them a strain resistant to the toxic effects of cobalt. The BMSG disagrees with EPA's interpretation of the Hydroqual 1996 toxicity test and maintains that the acute to chronic ratio (ACR) of 11.5 is too high. The BMSG position is that the chronic value is artificially low as no effects were observed at the maximum test concentration of 0.213 mg/L. This does not mean that effects would not have been observed at test concentrations just slightly higher. The BMSG should have rerun the toxicity test to obtain better endpoints, since their results were inconclusive. Therefore, it is possible that the BMSG study should not be used to develop the cobalt TRV for salmonids. Unfortunately, this would reduce the only site specific data to the 14-day NOEC obtained by RCG/Hagler Bailly of 0.124 mg per liter. Even if only this study was used, in order to adjust for interspecific variability in the absence of data for various species, this short-term subchronic NOEC would need to be divided by an appropriate uncertainty factor.

The BMSG's comments continue with a discussion of the Diamond *et al.* (1992) ACR. It is true that the Diamond *et al.* paper presents an ACR of 7.6 as an average value for fathead minnows and *D. magna*. BMSG then derived an ACR for cobalt in soft water using a geometric mean of the 50 mg/L water hardness values of 1.01 and >46.9, stating that this was based on data generated by Diamond *et al.* However, based on the BMSG's own definition of an ACR (i.e., 96 hr LC50/chronic value), BMSG's ACR derivation was incorrect. The ACR of 1.01 cited from Diamond *et al.* (1992) was derived using a 48-hour NOEC, not a 96-hour LC50, according to a footnote in the paper. This leaves only an ACR exceeding 46.9 for soft water from the Diamond *et al.* study.

The BMSG continues with a discussion of the ACRs for copper, arsenic, zinc, lead, nickel, and silver, apparently to refute EPA's general statement that ACRs can fall around the value of 10. EPA's general statement was intended to be just that, and the values presented by the BMSG do not appear to refute this statement. The ACRs presented by BMSG range from 2.2 to 51.3, suggesting that ACRs for metals vary widely. This is to be expected since the modes of toxic action of these different metals are also expected to be different. Given how widely the ACRs shown by BMSG vary for metals, the data suggest that it would be more appropriate to have a higher ACR for cobalt (for which the mechanism of toxicity is uncertain) rather than a lower

ACR of 7.6 given the general lack of toxicity information available for aquatic life. The Diamond *et al.* data were not used by EPA to derive the cobalt TRV because these data were not specific to salmonids.

The 28-day LC50 was divided by the ACR because, for a significant part of the test, the organisms were exposed in a life stage that the BMSG has maintained is insensitive (i.e., the egg stage). Because the EPA concurs with the BMSG on the sensitivity of salmonid eggs, it is appropriate to consider only the post-hatching portion of the test as actual exposure. The Birge *et al.* study states that embryos were exposed from fertilization to one day post-hatching. Therefore, it is appropriate to divide this 28-day LC50 by an ACR.

Comment 3. *Page 11, Issue 3. The BMSG position is that application of an uncertainty factor of 6 derived from the BMSG Hydroqual (1996) data for salmonids exposed in Panther Creek water is not appropriate. This uncertainty factor was obtained by comparing the response of a sensitive strain of trout to the response of a resistant strain of trout. This indicates that there is uncertainty in the toxicity data within one species of salmonid.*

Response 3. The BMSG's position on this issue is not relevant to setting of the cobalt cleanup level. The data are inadequate by which to derive a national water quality criteria guideline, and EPA has acknowledged this point. The intraspecific differences in sensitivity are apparent from the toxicity tests performed by the BMSG. There are insufficient data to fully incorporate these intraspecific differences without use of an uncertainty factor. Application of an uncertainty factor of 6 derived from the site specific data is appropriate.

Comment 4. *Page 12, Issue 4. The BMSG objects to the application of the ACR to a toxicity endpoint besides the 96-h LC50, and requests that an additional comparison be considered of the RCG 96-h LC50 of 1.427 mg/L divided by the BMSG ACR of 11.5, resulting in a NOEC of 0.124 mg/L.*

Response 4. The BMSG's position on this issue appears to be in direct conflict with the BMSG's earlier issues regarding the ACR of 11.5 being too high. Application of the ACR of 11.5 to the 96-hour LC50 results in a NOEC nearly identical to the 14-day NOEC measured in the study. EPA's response to each of the points made by the BMSG is as follows:

- Number 1. The Birge *et al.* 28-day LC50 can be acceptably divided by the ACR since the bulk of the test was conducted on an insensitive life stage.

- Number 2. EPA will incorporate the 96-hour LC50 as requested by BMSG. EPA points out that this does not alter the median concentration, and that this effort by BMSG serves to strengthen confidence in the ACR of 11.5 derived from the BMSG Hydroqual (1996) study.

- Number 3. The Hydroqual LC50 data were directly used to obtain the ACR. Therefore, they should not be used in conjunction with the ACR to estimate the TRV.

Comment 5. *Page 13, Issue 5. The BMSG maintains that there is no cobalt-copper interaction indicated by the copper-cobalt interaction study performed by the Trustees consultant, RCG Hagler/Bailly and published as Marr, et al. (1998). The BMSG's position is that, because the data were not statistically significant, no copper-cobalt interaction effect exists.*

Response 5. The EPA maintains that the Marr *et al.* study indicates a potential interactive effect between cobalt and copper that is relevant to the Blackbird mine site. However, the Marr *et al.* cobalt copper interaction tests cannot be used to either refute or prove the presence of interaction of cobalt with copper toxicity. For this reason, this study was used in a weight of evidence manner, and not to develop the numerical cleanup level of 0.038 mg/L.

Trends are often used in scientific literature, particularly with biological data, for which variability may preclude statistical significance, yet where trends are obvious. EPA has previously stated that trends should be considered, but that they do not constitute proof. The Marr *et al.* paper only suggested that at cobalt concentrations above 50 ug/L (0.05 mg/L), the toxicity of copper increases.

Comment 6. *Page 14, Issue 6. The BMSG questions the controls used in the Marr et al. study, and maintains that EPA failed to address this concern previously raised by the BMSG.*

Response 6. EPA's presentation, as included in Exhibit G, is missing extensive verbal input that was provided by Dr. Douglas Beltman (one of the co-authors of the Marr *et al.* paper) during the March 27, 2002 meeting. Therefore, it is misleading for the BMSG to state that EPA failed to address the essence of Issue No. 6. Substantial input and discussion on this issue was made by Dr. Beltman regarding the paper. The end result of these discussions was that the data were sound, the conclusions are adequate, and that animal sensitivity is unlikely to have explained the differences.

Comment 7. *Page 16, Issue 7. The BMSG further questions the controls used in the Marr et al. (1998) study, which EPA points out was not used numerically in the TRV position paper.*

Response 7. The Marr *et al.* study was used by EPA only as an additional line of evidence. This is acceptable under the water quality criteria guidelines which state that questionable data "may be used to provide auxiliary information, but should not be used in the derivation of criteria". The TRV position paper indicated that this study was used only as an additional line of evidence; EPA included this information in the event that future studies could be performed to further elucidate the interactive nature between cobalt and copper, and to maintain an awareness of the potential for mixture toxicity.

Comment 8. *Page 17, Issue 8. The BMSG indicates that none of the invertebrate toxicity studies are adequate by which to establish a cleanup level for salmonid food items. The BMSG continues to maintain that daphnid data should be totally rejected from consideration in development of an invertebrate TRV.*

Response 8. EPA has acknowledged that Daphnia are not likely to be present in the Panther Creek watershed because it is a lotic ecosystem. EPA has also stated that, due to lack of invertebrate data, Daphnia are representative of invertebrates, and Daphnia are commonly used toxicity test organisms which form the basis of many water quality criteria. Therefore, the inclusion of daphnia data is appropriate. EPA maintains that the Tier II value of 0.023 mg/L is appropriate as the TRV for invertebrates, unless additional data are collected that would demonstrate otherwise. EPA has addressed the strengths and weaknesses in each of the cobalt toxicity papers, including the data derived by the BMSG, and has treated each of the studies fairly.

Comment 9. *Page 17, Issue 9. The BMSG maintains that the Tier II value is totally driven by the daphnid data, while EPA has stated that it is weighted, but not totally driven.*

Response 9. This appears to be an issue of semantics. See response to Comment 8 above as to why daphnid data are pertinent to the derivation of an invertebrate TRV.

Comment 10. *Page 19, Issue 10. The BMSG objects to all of the invertebrate toxicity studies available and used by EPA in the cobalt TRV position paper, among them a study by Sodergren. The BMSG suggests EPA consider an additional study by Warnick and Bell.*

Response 10. Sodergren was not used in the numerical computation of the TRV because of consideration of the methodology problems that the BMSG brought up in comments; however, Sodergren was maintained as an additional line of the evidence.

Although the data presented in the Warnick and Bell paper suggest that there was 50 percent survival at seven to eight days at 32 mg/L cobalt for two invertebrate species tested, the discussion in the paper clearly states the metal concentrations in test solutions decreased considerably over the duration of this study. This indicates that adsorption, precipitation, or some other physical-chemical change was occurring, and the authors stated that metal concentrations were only considered to be stable for 48 to 96 hours. Therefore, even the 96-hour test value is in question. The authors go on to state that the TLm (the concentration at which half the population survived) values are given in terms of initial concentrations, thus not reflecting the above mentioned decrease.

EPA did not use the Warnick and Bell study because the values in the study appeared to be excessively high relative to other information. EPA has compared the acute toxicity values reported in this study to the acute and chronic water quality criteria. For three different metals, the 96-hour TLm is well over a thousand times higher (range 1,400 to 1,694) than the chronic ambient water quality criteria (i.e., the CCC). This implies that half the test population dies at a concentration about 1,500 times that of the CCC. While this comparison is not conclusive because only three metals were compared, it suggests that any criterion that utilizes this study must be substantially lower than any of the TLm values reported by Warnick and Bell. If cobalt followed a similar pattern to cadmium, copper, and mercury, the cobalt water quality criterion would be a value of 16.0 mg/L (the TLm for *Ephemerella*) divided by an uncertainty factor of

1500, which would make the resulting endpoint approximately 0.010 mg/L, lower than the existing cobalt cleanup level.

Comment 11. *Page 19, Issue 11. The BMSG states that the Diamond et al. (1992) paper cannot be used due to effects on control organisms. BMSG indicates the Lind value cannot be verified as the reference is missing. BMSG maintains that the study cannot be used for the invertebrate TRV since Daphnia do not occur in the Panther Creek ecosystem.*

Response 11. The BMSG's position on this issue is not relevant because the Diamond *et al.* paper was not used by EPA in setting the cobalt cleanup level. It was only used in the Tier II invertebrate TRV describing potential ecological risks in the Aquatic Ecological Risk Assessment.

For further discussion on the Daphnia issues, see EPA responses to Comment 8 above.

Comment 12. *Page 20, Issue 12. The BMSG states that the site specific data indicate a PRG for cobalt for salmonids of 0.125 to 0.213 mg/L, and that a TRV for invertebrates cannot be established. The BMSG maintains that site specific data are the only ones that should be considered, and that the Tier II value is overly conservative.*

Response 12. EPA disagrees with the BMSG on the appropriate value for the cobalt cleanup level. See responses to the above comments regarding the limitations of the site-specific salmonid data and their use without application of an uncertainty factor for taxonomic variability, and the above responses regarding the invertebrate TRV, which is not considered numerically in establishing a cleanup level for cobalt.

Comments from Residents

Comment: *One commentor was disappointed the public meeting was cancelled and wanted to know the nature of the security concerns leading to the cancellation of the meeting.*

EPA Response: The public meeting was canceled due to threatened disruptions of the meeting and possible harm to participants. There were no particular concerns about the Panther Creek Inn area. In lieu of the meeting, EPA staff was available to talk one-on-one with any concerned citizens.

Comment: *One commentor wanted to know if the proposed cleanup plan would make the water in Big Deer Creek suitable for human consumption.*

EPA Response: Based on the human health risk assessment, arsenic in Big Deer Creek does not pose a potential risk for human consumption under recreational use. In addition, arsenic in Big Deer Creek does not exceed the State water quality standard for humans nor the federal drinking water standard of 10 ug/L for public water supplies.

Comment: *One commentor wanted to know if beaches along the Salmon River below the mouth of Panther Creek were contaminated and pose a potential risk to humans.*

EPA Response: There has not been extensive investigation of the beaches (i.e., overbank areas) along the Salmon River downstream from Panther Creek. The primary reason is that the concentrations of arsenic in overbank sediments along Panther Creek decrease significantly with the distance downstream from Blackbird Creek. The primary source of the arsenic in the overbank areas was mining activities along Blackbird and Meadow Creeks. The arsenic was transported down Blackbird Creek and deposited at the overbank areas along Panther Creek during large flow events, primarily following the period of greatest mining activity in the 1950s and 1960s. The nature of these large flow events is that the sediments become significantly diluted as they are transported downstream. For example, the arsenic concentrations in the overbank areas near the old Cobalt townsite, located about two to three miles downstream from Blackbird Creek (about 22 to 23 miles upstream from the Salmon River) averaged from about 1500 to 2100 parts per million (ppm) arsenic prior to cleanup in 2001. As the sediments were transported downstream, they became diluted. The furthest downstream recreational area that was demonstrated to have an unacceptable arsenic risk was the Napias Creek area, about 19 miles upstream from the Salmon River. The arsenic in the overbank areas near Napias Creek averaged about 825 ppm prior to cleanup. Further dilution occurred downstream from the Napias Creek area. In the lowest 5 miles of Panther Creek (0 to 5 miles upstream from the Salmon River), the arsenic in overbank areas averaged from about 50 to 279 ppm (13 overbank areas were sampled in this reach), which does not represent a risk under any of the recreational scenarios.

Any sediments transported from Panther Creek into the Salmon River would likely have been further diluted by the sediments in the Salmon River before they would have been deposited in overbank areas along the Salmon River. It is therefore extremely unlikely that any arsenic in overbank areas along the Salmon River would even approach the arsenic cleanup level for recreational areas (280 ppm for camping areas and 590 ppm for day-use areas). Thus, EPA determined that a sampling program for the overbank areas along the Salmon River was not necessary. Regardless, a reconnaissance of overbank areas along the Salmon River downstream from Panther Creek was conducted by the Idaho Department of Environmental Quality in 2000. A sample was collected in the only overbank area where it appeared that arsenic concentrations might be elevated. The arsenic concentration in this sample was less than 100 mg/kg, the detection limit of the analytical instrument (field portable x-ray fluorescence spectrometer).

Comment: *One commentor urged recovery and restoration of Panther, Meadow, Blackbird, Bucktail and Big Deer Creeks to enhance the habitat of the salmon and bull trout.*

EPA Response: The objective of the cleanup at the Blackbird Mine is to restore water quality and other aquatic life to levels capable of supporting anadromous and resident fish in Panther Creek (which include salmon and bull trout), South Fork of Big Deer and Big Deer (which include resident fish and bull trout if present in upstream waters). The objectives of the cleanup for Bucktail and Blackbird Creeks are different than for the other creeks. This is because the State of Idaho performed a Use Attainability Analysis and removed aquatic life protection as a

designated beneficial use for Bucktail and Blackbird Creeks. Meadow Creek is a tributary to Blackbird Creek. As a tributary to Blackbird Creek, the States' beneficial use for Blackbird Creek also applies to Meadow Creek. As a result there is not a State water quality standard for protection of aquatic life in Bucktail, Meadow and Blackbird Creeks. The objectives of the cleanup in Blackbird and Bucktail Creeks are to improve water and sediment quality such that cleanup levels are not exceeded downstream in Panther Creek and Big Deer Creek respectively. In addition, the remedial goal for Blackbird Creek is to support aquatic life at levels similar to that of nearby reference streams, although not necessarily to support salmonids (i.e., salmon or bull trout) or metals-sensitive macroinvertebrate taxa. Meadow Creek is above the Early Action cleanup facilities and restoring water quality is not a goal of the remedial action.

Comment: *One commentor was concerned that, as part of Alternative P-2, institutional controls would be placed on their property.*

EPA Response: Institutional controls are being considered at only the properties identified in the Proposed Plan, not at all the properties along Panther Creek. The properties identified in the Proposed Plan are Rogers, Rufe, and former Strawn, and properties that were cleaned up as part the Early Actions that have contaminants remaining at depth.

Comment: *A property owner along Panther Creek whose property is addressed in the Proposed Plan commented that they do not want a cleanup option that would devalue their property unless they were adequately compensated.*

EPA Response: The property owners concerns are considered in the selected remedy in the ROD. One of the criteria that must be met for not removing the contaminated material and invoking Institutional Controls is the property owners' acceptance.

Comment from the Salmon-Challis National Forest

Comment: *The Forest Service expressed an interest in implementing BT-5 in phases. This would enable field monitoring to confirm the need for the Bucktail Creek pipeline for the purpose of meeting Applicable, Relevant and Appropriate Requirements (ARARs) in the South Fork of Big Deer Creek and for meeting the Ambient Water Quality Criteria (AWQC) for copper at the compliance point in Big Deer Creek prior to the pipeline's construction. If field monitoring indicates that the diversion is needed, then treatment of the pipeline effluent and contaminated stream sediment should be evaluated and implemented, if feasible, to reduce the level of contaminants being discharged to Big Deer Creek.*

EPA Response: EPA does not believe that a phased approach for implementing Alternative BT-5 in the Bucktail Creek drainage is a viable option. This is because if the bypass pipeline were not constructed, the predicted post-remediation concentrations of both copper and cobalt would be significantly above the water quality cleanup levels established for South Fork Big Deer Creek. As shown in Table 7-11b in the Feasibility Study, without the bypass pipeline the post-remediation concentrations for copper in South Fork Big Deer Creek would average about 22 µg/L in the spring and 47 µg/L in the fall, which is significantly above the Idaho water

quality standard for copper (the hardness-based copper standards are also shown in Table 7-11b). The post-remediation concentrations for cobalt would average about 49 µg/L in the spring and about 57 µg/L in the fall, also above the cobalt cleanup level of 38 µg/L.

The values shown in Table 7-11b were calculated assuming that the seep collection system in Bucktail Creek would be 65% effective at removal of the loads, which is probably conservative. However, even if a more optimistic removal effectiveness of 80% is assumed, the post-remediation concentrations of copper in South Fork Big Deer Creek would be considerably greater than the water quality standard if the bypass pipeline is not constructed. A calculation assuming 80% removal indicated that, while the cobalt cleanup level would be met, the copper concentrations in South Fork Big Deer Creek would average about 13 µg/L in the spring and about 27 µg/L in the fall. These values would be about 1.3 to 2.7 times the water quality standard. In addition, it is likely that metal releases from Bucktail Creek sediments will cause the copper ARAR and cobalt cleanup level to be exceeded in South Fork Big Deer Creek.

Given the water quality predictions above, the seep collection is not enough by itself to meet the copper ARAR in South Fork Big Deer Creek. In addition, metal releases from Bucktail Creek sediments will likely cause the copper ARAR and cobalt cleanup level to be exceeded in South Fork of Big Deer Creek. Therefore, implementation of the seep collection and then performance of monitoring to determine if the diversion is needed is not supported by the water quality predictions and is not justifiable. However, treatment of the pipeline effluent will be evaluated in the future as a contingency if monitoring indicates that the copper ARAR in Big Deer Creek is not met.

Comments from the State of Idaho

Comment: *The State commented that it does not appear that the pipeline or ditch diverting Bucktail Creek around the South Fork of Big Deer Creek, contemplated in BT-5, will further efforts to meet the water quality criteria or to sustain all life stages of salmonids in Big Deer or Panther Creek. A pipeline may be necessary in the future to provide a passive treatment system to meet water quality in Big Deer Creek and/or Panther Creek.*

Alternative BT-5, diverting Bucktail Creek into a ditch or pipeline around the South Fork of Big Deer Creek may have its own environmental costs and may involve a significant long-term maintenance burden while providing only limited environmental benefit. EPA may wish to reconsider the environmental costs vs. the environmental benefits of this element of Alternative BT-5.

EPA Response: The State is correct that the diversion of Bucktail Creek does not affect meeting cleanup levels in Big Deer Creek or Panther Creek. The purpose of the pipeline is to meet the copper and cobalt surface water cleanup levels in South Fork of Big Deer Creek which includes meeting the state water quality standard for copper which is an ARAR. The diversion is expected to be constructed primarily along the existing Bucktail Creek road, and the pipeline will be underground. Therefore, the diversion will have very little environmental costs or disruption. The long-term maintenance of a pipeline or ditch is minimal and straightforward and

no more onerous than the maintenance that already exists on the significant amount of pipeline and ditches that were constructed as part of the Early Action. The environmental benefit of the diversion is large as it will allow South Fork of Big Deer Creek to meet the state copper water quality standard and cleanup level for cobalt.

Comment: *The State determined that the pipe or ditch diversion in Alternative BT-5 could be defined as a point source discharge under Idaho Water Quality Standards. Therefore, the substantive requirements of NPDES permits and mixing zone may also be appropriate for the Bucktail drainage. The State concluded that subject to monitoring requirements the proposed "mixing zone" in Big Deer Creek needs to be accepted by the Department.*

EPA Response: In the ROD, EPA has determined that NPDES permit requirements are relevant and appropriate for the diversion into Big Deer Creek. Acceptance of the mixing zone is subject to monitoring that will include the requirements of the State.

Comment: *The State provided rationale on why the applicable Idaho Water Quality Standard should be used as the cleanup level for copper rather than the Federal AWQC as relevant and appropriate.*

EPA Response: In the ROD, the EPA is using the Idaho Water Quality Standard for copper as the cleanup level in surface water.

Comments from Idaho Conservation League

Comment: *The Idaho Conservation League (ICL) encouraged EPA to utilize the AWQC to establish cleanup goals for copper and arsenic. The State of Idaho's water quality standards for these pollutants are unacceptable and do not adequately protect human and aquatic health.*

EPA Response: EPA has determined that the State water quality standards are applicable to the cleanup and that the AWQC for copper is not relevant and appropriate at this site. EPA has determined that the AWQC for arsenic is relevant and appropriate. These determinations were based on the statutory factors set forth in Section 121(d)(2)(A) and discussion in Section 8 and Section 13 of the ROD.

Comment: *The ICL expressed concern that the EPA has chosen a "non-numerical narrative" cleanup goal for the area and should have a numeric goal. The ICL is concerned that the narrative goal will result in arguments on "how clean is good enough". It would be better to have a numerical goal so there is little doubt about what "clean" means.*

EPA Response: The narrative cleanup goals are only utilized in streams that are not protected for aquatic life. In such streams, EPA has established a narrative goal to ensure that steps are taken to improve the quality of these streams and to eliminate adverse downstream impacts.

Comment: *The ICL continued to object to the state of Idaho's removal of the aquatic life as a beneficial use and the curtailment of recreational contact as a beneficial use for the streams impacted by the Blackbird Mine.*

EPA Response: Blackbird Creek and Bucktail Creek are the only streams impacted by the Blackbird Mine where the aquatic life beneficial use has been removed. The state re-evaluates beneficial use designations every three years. At such time the State may revise the beneficial use designation. EPA's water program (not CERCLA) will review any future beneficial use changes.

Comment: *It is stated that the Institutional Controls would "preclude activities at the mine site that would interfere with the remedy." The ICL believes the proposed operation of the Idaho Cobalt Project would interfere with the remedy. EPA needs to make it clear that the future operation of the Idaho Cobalt Project is unacceptable until such time that the area's creeks are in complete compliance with all applicable water quality standards and it can be demonstrated that the Idaho Cobalt Project will not exacerbate water quality problems.*

EPA Response: Under CERCLA, EPA only has the authority to preclude activities at the mine that would interfere with remedy. The US Forest Service is performing an Environmental Impact Statement (EIS) for operation of the Idaho Cobalt Project pursuant to the National Environmental Policy Act (NEPA). The EIS will go out for public comment. EPA is participating in review and comment on NEPA documents.

Comment: *The ICL expressed concern that a soil cap is not sufficient. Their two main concerns are: 1) it seems inappropriate to use the contaminated soils removed from overbank areas on Blackbird Creek as a cap, and 2) water will continue to percolate through a soil only cap. The need for and environmental benefit from an impermeable cap should be evaluated.*

EPA Response: A clay cap for the West Fork Impoundment was evaluated in Appendix D of the Feasibility Study. This evaluation indicated that a clay cap may be somewhat more effective at reducing cobalt discharges from the West Fork Impoundment (approximately 55 percent reduction compared to approximately 41 percent reduction). However, there are considerable uncertainties in the modeling used in Appendix D to predict cobalt reductions, both in terms of magnitude of reductions and in the time to achieve the reductions. This is true regardless of whether a clay cap or a soil cover is utilized. Because of these uncertainties, EPA proposed Alternative BB-7 in the Proposed Plan which provides for much greater certainty of cobalt reductions in a timely manner through treatment of the discharges from the West Fork Impoundment. The considerably greater expense of a clay cap is not necessary with Alternative BB-7 because this alternative is predicted to meet the cobalt water quality goals, even if there are no cobalt reductions as a result of the cover. Any reductions of cobalt loadings as a result of the cover (if reductions do occur in the future) would only mean that less of the discharge from the impoundment would need to be intercepted and treated to meet downstream cobalt water quality goals.

It should be noted that the West Fork Impoundment is not a significant source of copper to Blackbird and Panther Creek, which is why the evaluations and loading predictions in Appendix D of the Feasibility Study focused on cobalt reductions. A clay cap would not result in significant reductions in copper loadings from the West Fork Impoundment compared to a soil cover.

Comment**:** *The ICL expressed concern over reliance on natural recovery for instream sediments. They felt EPA should describe the mechanism at work is the redistribution and eventual dilution of pollutants. They are concerned that reliance of natural recovery will not provide the assurance that standards are met in any specific number of years. EPA should set minimum standards and expectations for this cleanup mechanism.*

EPA Response: In the proposed plan, EPA describes that natural recovery of instream sediments includes a variety of natural, physical, chemical and biological processes that result in the concentration of contaminants in sediments being reduced over time without taking active measures (such as dredging) to achieve cleanup levels in sediments. For example, metals concentrations are reduced by physical sediment transport from scouring and mobilization of fine-grained sediments until concentrations in sediments are reduced to cleanup levels.

Meeting sediment cleanup levels in Panther, Big Deer and South Fork of Big Deer Creeks is not as time critical for improvement of aquatic habitat quality as is meeting the surface water cleanup levels. The reason is that most of the current measured sediment concentrations are below known probable toxic levels; thus, benthic communities should not exhibit high levels of impact due to sediment exposure. Salmonids are not expected to be directly impacted by sediment concentrations, and the food supply for salmonids provided by the benthic community should improve as water quality is restored. Numeric sediment cleanup levels are provided in the ROD for Panther, Big Deer and South Fork of Big Deer Creeks. However, the time to achieve sediment cleanup levels is not expected to affect the long-term effectiveness.

Comment: *Concerns with the preferred alternative BB-7; ICL does not believe the NPDES permit should allow the use of a mixing zone.*

EPA Response: An NPDES permit is not required for a cleanup being performed under CERCLA. However, the substantive requirements of NPDES should be followed. In accordance with the Clean Water Act and the State of Idaho Water Quality Standards, point source discharges may allow a mixing zone. Monitoring after implementation of the remedy will be required to ensure that the mixing zone does not interfere with beneficial uses in Panther Creek. Acceptance of the mixing zone is subject to monitoring that will include the requirements of the State.

Comment: *ICL is concerned that EPA has failed to adequately address the initial contamination of waters in the Bucktail Creek drainage and has instead focused primary (and apparently solely) on the treatment/dilution of polluted Bucktail Creek water. EPA needs to address how it will keep the pit and tailings areas from contaminating water in the first place.*

EPA Response: As part of the Early Action, EPA determined that the best option for addressing contaminants coming from the pit, workings and waste rock piles in the Bucktail Creek drainage was through collection and treatment of contaminated water. The remedial action is a continuation of the Early Action.

Comment: *ICL objected to the diversion of Bucktail Creek around the South Fork of Big Deer Creek and then discharging into Big Deer Creek where larger flow allows a mixing zone capable of diluting the concentration of the pollutant. Bucktail Creek is horribly polluted and needs to be cleaned up. In addition, EPA needs to develop an NPDES permit for the Bucktail Creek diversion.*

EPA Response: The diversion of Bucktail Creek allows for the same amount of metals loading into Big Deer Creek as the other alternatives which allow Bucktail Creek to flow into South Fork of Big Deer Creek which flows into Big Deer Creek. The State of Idaho removed the beneficial use designation for aquatic life and recreation from Bucktail Creek and, consequently, there is no water quality standard (i.e., ARAR) that must be met. As noted in the use attainability analysis performed by the State of Idaho to remove the beneficial use, Bucktail Creek is too small to have any real likelihood of contact recreation and the physical conditions of the creek, such as it's steep gradient and small size and flow, likely preclude it being used for fish. Therefore, EPA has determined that a narrative goal for Bucktail Creek is most appropriate. Two alternatives were considered in the Feasibility Study that included active treatment of the surface waters of Bucktail Creek at the mouth of Bucktail Creek. These were identified as Alternatives BT-7 and BT-8. These alternatives were evaluated and screened out in Chapter 5 of the Feasibility Study because they would require a large dam or dams for storage, a large treatment plant to treat the surface waters, and extension of power lines, with corresponding short and long-term environmental impacts. In addition, these alternatives would be substantially more costly than Alternative BT-5 without providing significant improvement in water quality. If Alternative BT-5 cannot meet the water quality goals in Big Deer Creek consistently, EPA will evaluate contingent alternatives. One or more of these contingent alternatives would likely include treatment of the surface waters of Bucktail Creek, with treatment located at the downstream end of the diversion pipeline. In the ROD, EPA has determined that NPDES permit requirements are relevant and appropriate for the diversion of Bucktail Creek. Acceptance of the mixing zone is subject to monitoring that will include the requirements of the State.

Comment: *Sediment removal should be incorporated into preferred alternative BT-5. This alternative should be amended to include identification and removal of hot spots. This would allow EPA to minimize sediment load increases and maximize removal of pollutants. This approach is being applied in Blackbird drainage. EPA should do it in Bucktail drainage too.*

EPA Response: EPA believes that the seep collection should be implemented and then monitoring performed to evaluate the potential long-term effects of sediments to meeting surface water cleanup levels. Based on the monitoring, EPA may evaluate if additional actions on sediments are necessary to meet water quality cleanup levels in a reasonable timeframe. The evaluation of additional actions may include removal of hot spots, if warranted. Removal of overbank deposits, not in-stream sediments, is part of the remedy in Blackbird Creek drainage.

Comment: *ICL is concerned over the lack of specificity in the preferred alternative of a combination of alternatives P-2 and P-3. The ICL supports the joint use of both Institutional Controls and Sediment Removal in an effort to cleanup the Panther Creek area. However, EPA's discussion of which mechanism will be used and where is too vague to allow readers to understand the scope of the alternative and the expected efficacy of the plan. The development of numerical cleanup standards would aid EPA in decisions regarding where and when the application of P-2 and P-3 would be most appropriate for this area.*

EPA Response: The ICL has misinterpreted the proposed alternative for the Panther Creek drainage. The proposed alternative is to remove overbank deposits above the cleanup level at the Rufe and former Strawn properties. At some or all of the Rogers and Hade (if necessary) properties, Institutional Controls may be utilized if acceptance of the property owner and a grantee can be achieved. EPA plans to allow instream sediments of Panther Creek to naturally recover (also see response to comment on natural recovery).

Comments received from the Nez Perce Tribe

EPA received comments from the Nez Perce Tribe on November 22, 2002. The public comment period ended on October 10, 2002. EPA has reviewed the comments provided by the Nez Perce Tribe. Many of the comments provided by the Nez Perce Tribe are similar to the comments provided by other commentors. Since the Nez Perce Tribe comments were received after the close of the public comment period and since most of the comments are addressed above in response to other commentors, EPA is not providing a detailed response to each of the comments. However, the comments have been placed in the administrative record.